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THE
CONSTRUCTION
OF
MAPS and GLOBES.

In Two PARTS.

First, Contains the various Ways of projecting MAPS, exhibited in fifteen different Methods, with their Uses.

Second, Treats of making divers Sorts of GLOBES, both as to the Geometrical and Mechanical Work.

Illustrated with Eighteen Copper Plates.

To which is added, an
APPENDIX,

Wherein the present State of Geography is consider'd. Being a seasonable Enquiry into Maps, Books of Geography and Travel. Intermix'd with some necessary Cautions, Helps, and Directions for future Map-makers, Geographers, and Travellers.

LONDON, Printed for F. Horne, J. Knapton, R. Knaplock, J. Wyat, T. Varnam and J. Osborn D. Midwinter, R. Robinson, W. Taylor, J. Sawyer H. Clements, W. Mears, R. Gosting, W. Innes, J. Browne and W. Churchill. 1717.

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Part I. Contains the various Ways of
proving Maps explained in fifteen
distinct Chapters.

Part II. Contains the various Sorts
of Globes, and the manner of
using them.

By W. Blaeuw.

APPENDIX
To which is added
A TABLE of the
Manner of the ancient State of Europe.

Part I. Contains the various Ways of
proving Maps explained in fifteen
distinct Chapters.

Part II. Contains the various Sorts
of Globes, and the manner of
using them.



To the Honourable

Samuel Molyneux, Esq;

Secretary to his Royal Highness the

PRINCE,

SIR,



IN Addresses of this Kind, Authors oftner consider the Fortune, than the Capacity of the Persons; and so they be but great enough, never mind whether they be proper Judges of what they offer them. But no one can imagine I have gone amiss, who in making Choice of you for a Patron, have found both one and the other. However, Sir, to do my self but Justice, I must own it was my more than ordinary Esteem for your mathematical Character, that made me propose to my self the Honour of dedicating these Sheets to you.

I know, Sir, that a Character is what is always expected from a Dedicator; and that the World will be inquisitive to know what should be said in yours, of which it is already possess'd with the most advantageous Sentiments.

DEDICATION.

But your Modesty makes a very good Excuse for my Incapacity; for, Sir, your vast natural Endowments, and your as vast acquir'd Knowledge; your Zeal for the Advancement of polite Learning, and your singular Humanity; in short, those consummate Abilities which you must be Master of to qualify you the earliest of the Age for the Post you adorn, are Excellencies as much above my Praise, as Imitation.

It would be in vain for me to conceal the Satisfaction it gave me, that you were pleas'd to think there was something more upon the Subject relating to Maps and Globes, than you had met with elsewhere; but more especially when I perceiv'd you had a favourable Opinion of the Appendix; which being an Attempt unprecedented, that I know of, I had all the Reason in the World to be dubious of the Success of it, 'till it had your Approbation.

The Abuses of negligent and unskilful Geographers, had long since made something of this Kind necessary, in order to put a Stop to those spurious Maps and incorrect Books which were daily publish'd by them, and continu'd more and more to involve Geography in Error and Contempt. However, it would be well, if it only suffer'd an Injury, which at worst was in the Power of a careful Hand to remedy. But alas, Sir, Geography lies under Obstructions vastly more prejudicial to its Welfare. The best Accounts of Travellers, are not free from Errors; their many irreconcilable Differences perplex and mislead us, and much of Countries remain undiscover'd. But whence
comes

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comes this to pass? It is not because proper Persons were never purposely employ'd to make Discoveries in foreign Parts?

I believe, Sir, I shall have your Opinion with me, that the publick Encouragement has been wanting in nothing more than this Article; for what could redound more to the *British* Fame, of improving Arts and Sciences, than the setting so noble a Project on Foot? Geography and Astronomy would not be the only Branches that would benefit by it: Nor would not our Trade fail of its Accompt in it.

For to what Purpose, in the Beginning of the last Century, were so many Agents sent into divers Parts, as *Turky*, *Persia*, *India*, and even *Tartary* it self, and so many Enquiries made to discover the several Roads into those Countries, by Order of the *East-India* Company? If it was not that sagacious Body was sensible of what Importance it would be in chusing out convenient Situations for their Factories, to have Memoirs of the Parts they intended to settle in, laid before them.

It cannot be objected, as if we are acquainted with as much of Countries as is necessary for carrying on our Trade in them to all the Advantage it is capable of, since none knows what Inducements there might be in several unknown Parts of *Persia*, *India*, and even *Arabia*, to extend our Settlements thither. I could mention some Parts, both of the old and new World, whither it was thought the Commerce would be unprofitable, 'till it was try'd; and if it may not be inconsistent to suppose, that the sending *F. Avril*, by the late *French* King,

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King, to find out a Way through *Tartary* to *China*, was done with a Political, as well as Religious View, it not only proves how essential such Discoveries are to Commerce, but also that the Trade that Way is not to be slighted.

Nor can I think it of the least Account to observe, that the *Romans*, who seldom did any Thing of which they were not convinc'd of the Advantage, thought it worth their While to send Persons duly qualify'd into all Countries, to make Observations; and it may not be absurd to imagine, that the speedy Conquest of them, was in a great Measure owing to those Informations they receiv'd from their Emisaries.

It is upon these, as well as many other Accounts, that Geography seems to merit the National Concern, more than it has hitherto experienc'd; tho' methinks there should need no other Motive, than the Improvement of Learning, to a Nation which, by its Pretensions to that Character, seems more than any other oblig'd to propagate the Means requisite to support it. But I need not take up your Time, Sir, with what you are convinc'd of, upon infinitely better Arguments than 'tis in me to offer; who paying the greatest Deference to your Judgment, value my self upon this Performance, only as it gives me an Opportunity of devoting my self,

SIR,

Your most humble Servant.

T H E
P R E F A C E.

I Have often wonder'd, that among the Numbers of Mathematical Books design'd for the Schools, there hath not been written a particular Treatise of Maps; a Thing so fundamental to the right understanding of Geography, to which the Genius of Youth is generally aditted. Nor do I find that any tolerable Account of their several Projections has been yet publish'd in any Language; for neither Varenus in Latin, nor his Abridger (a) Idea of (a) Newton in English, are Navigation, so compleat as requir'd; the former having committed many Mistakes, as in the Construction of the Globical Papers, Horizontal Planisphere, &c. and omitted some of the Projections, and the other omitted more; not to mention that those Accounts being only a small Part of

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of different Treatises, the Buyer, to procure so much, must be oblig'd to pay for at least ten times more than he needs. And yet these were all the Helps we had, before Alingham, a few Years since, publish'd his short Account, as he calls it, of Maps; which, however, is more properly an Explanation of the Circles on the Globe, and Maps: For in 25 Sections, into which that Author divides his Treatise, we have the Construction of no more than one Projection, the same with Chap. 16, the rest being for the most Part taken up with Geographical Definitions, and Astronomical Tables, to be found almost in every Book of Geography and Navigation, and very little, if at all, to the Purpose; so that a Treatise of Maps seem'd to be still as much wanting as ever.

This made me hope it would not be long before something more compleat upon the Subject would come out, than what has hitherto appear'd; but seeing no Sign of what might have been reasonably expected, rather than so necessary a Work should be left undone, I was tempted at last to expose the following Sheets to the Publick, which were penn'd only for my own private Use, as a Help to the Memory, which in Studies, particularly

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cularly of this Kind, often stands in Need of one.

However, we doubt not but the Student will find his Account in This having been the original Design of this Treatise, since it naturally suggests, that in writing it we study'd Brevity as well as Plainness, as the best Way to convey Rules easily to the Head; avoiding to insert any Thing which we did not judge immediately to appertain to the Construction of Maps and Globes; so that he will be charg'd with little more than what will be just necessary.

Tho' the Reader will find that the whole Treatise, and most of the Projections, are handled after a new Method; yet we did not neglect consulting some of those that writ before upon the Subject, particularly Varenus and Newton; to the first we are beholden for some Helps in the perspective Rules and orthographick Projections, and to the latter principally for the Auxiliary Line, useful in finding the Distance in Wright's Chart: Nor must we forget our Obligations to Alingham, for the Method for finding the Distance in circular Maps, Chap. 6. But it may be expected something more particular should be said with Regard to what is offer'd in the following Sheets.

I have

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I have divided this Treatise into three Parts, the first contains the various Ways by which Maps commonly are or may be made, exhibited in 15 different Projections, some of which are perform'd two or three Ways; particularly the Horizontal, which the Reader will find to be done after a more exact and easy Method than had been before prescrib'd, at least that I could find; Wright's Chart is projected five several Ways, and I think nothing like the 15th Projection hath been hitherto treated on by any; but because some late Maps seem to be drawn by a like Method, I shall not attribute the Invention to my self, or insist that I did not see them soon enough to take the Hint from them.

For the better Illustration of each Method, I have annex'd a Scheme 16 in Number, the upper Figure being an Example to the Rules, and the lower is to shew the Goodness or Defects of each Projection, and their Diversity, compar'd with one another, by a Representation of Asia, which, as most convenient for the Purpose of the four Quarters, I chose to exhibit.

The second Part treats of making the several Sorts of Globes; the first and second, I must confess, are rather curious than

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than useful; but I put them in, because Things of the Kind have been done, and I was willing to omit nothing that might any Way inform the Curious upon the Subject. I flatter my self that the Reader will find something to gratify his Curiosity in the Description of Paper-Globes, as well with respect to the Mechanical Part, which I have inserted for the Amusement of such Gentlemen as take Delight in being Mechanically employ'd, as the Projection of the Papers; for performing which, a more correct and easy Method is propos'd, than what was before in Use, with two Schemes annex'd.

It might be expected, that to the Construction there should follow the Use of Globes, as indeed was at first intended; but considering there would be nothing new in That, (there being many Treatises upon the Subject already abroad, as Moxon, Morden, Gorden, Harris, &c. to which last, as the most short and full, I refer the Student) I alter'd my Thoughts, and in the Room thereof have subjoin'd a third Part by Way of Appendix, being an Essay towards the Correction and Improvement of Maps and Geography. I cannot think any Lover of Geography will be offended with the Liberty that is there taken, that see the Neglects of Geographers and Travel-
lers,

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lers, and how much Geography is a Sufferer by them. How much is Mens Zeal for cultivating the Knowledge of foreign Parts slacken'd to what it was? There was a Time when Geographers and Travellers corresponded; and the one was very diligent to bring Home Observations, while the other spar'd no Pains to collect them, as so many Jewels, and improve their Books and Maps by them. The Design therefore of this Essay, is to revive (if possible) that generous Spirit once again amongst us, and excite Youth to the Study of so delightful and profitable a Science; a Science without which one can never be a good Historian, nay, nor even understand History.

'Tis true, I might have enlarg'd this Part considerably, by multiplying Instances under the respective Heads from Books and Maps, of the several Mistakes and Neglects of Authors there observ'd, (1.) in Respect to Map-makers, I might have exemplify'd the Inconvenience of using many and different Meridians, by observing some Errors that arise from them; it might also have been expected, that I should have referr'd to the particular Maps, from whence the Errors are cited; but that would be as needless as endless, in regard it will not be easy to meet with any (that
are

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are not Copies of De Lisle's) wherein some of them are not to be found; tho' where the Copiers have not follow'd that Author, they often err too, as in one of the late Copies of his Map of Asia, Bir (on the Euphrates) is plac'd more Southerly than Aleppo; tho', according to Thevenot's Journal of the Road between them, who observes the Bearing from Place to Place, but especially from the judicious Maundrell's Observation, who found the Latitude of Beer to be $37^{\circ} 10'$, it should be 20 Minutes more North than Aleppo, which was found to be in $26^{\circ} 30'$. I had forgot to observe that Van is plac'd on the South Side of its Lake in former Maps, which should be on the North or North-East.

(2.) In the Remarks upon our modern Geographers, I might have insisted fuller upon the Proof, and shewn what Mistakes they are liable to, for want of consulting or being acquainted with the Travellers. Thus the Authors of Moll's Geography suppose Asanchif and Diarbekir to be the same, because I suppose they find the former describ'd by Sanfon, and yet mention'd in none of the modern Travellers. But there is an old anonymous Author in * Ramusio, who travell'd * Vol. 2. p. 78. those Parts in 1507, that gives a particular Description of them both, and

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and the Road between them.

* Part. 3. Ch. 3. *Besides, Sir Paul Rycaut * reckons both Amed (Diarbekir) and Chasenghif (Asanchif) among the Sangiacks of Diarbekir; so that 'tis probable it is not destroy'd, as some others suppose. And though I say, p. 163, Gorden's would be a compleat Piece, if the Topography was fuller; yet I admire the Tables of Asia, Africa, and America, should pass thro' so many Editions without any Alteration, considering what Errors the late Discoveries have made appear in the Geography of those Parts, and consequently that they must give the Student a wrong Notion of them, (3.) With Relation to Travellers, I might have brought farther Proofs of the Mistakes and Differences among them, arising from their want of Capacity, or Care, in observing and making Enquiries about Places; and thence enforc'd the Necessity, at least, of their understanding Geography. Thus Baldeus, in the very Entrance upon his Account of the Indies, makes a false Step, and asserts, that Cambala is seated upon the River Indus. Rabbi Benjamin * makes the River Arnon fall into Jordan, with-*

Rycaut, Fol. 55,

* Itin. Benj-
mini, cum Notis
Const. L. Empe-
rur, p. 54.

bala is seated upon the Ri-
ver Indus. Rabbi Benja-
min * makes the River Ar-
non fall into Jordan, with-

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Fol. 55, says Bosra (Bassora) is a Persian City, in the Sinus Persicus, near Biblis in Phœnicia. Fol. 52, says, Sangiar is the same with Diarbekir, tho', Fol. 176, he makes Amid and Sangiar two distinct Cities: I suppose that Gentleman was unacquainted that Amid and Diarbekir was the same; and not finding the latter mention'd, as might be expected, among the Sangiacks, took Sengiar for it, tho' indeed that City is not near it, but Mosul. I might have given Cautions and Directions for adjusting the Distances ascrib'd by Authors; we see in the old Maps of Tartary, what mistakes the Journal of Goes led former Geographers into, by forming to magnify the Distances. There is no uncertainer Way of reckoning, than by Days Journeys, or Stages, if the Rate of Travelling be'n't observ'd; for one Man often goes in one Day what takes another up two or three, nay, sometimes 4 or 5, as is obvious from that same Journal, and many other Places in Travellers. The irreconcilable Difference between Cartwright and Mindenhal, (tho' Fellow-Travellers) in their Accounts of the Distance between Van and Zulpha, the first making it three Days, and the latter seven, leaves us at an entire Loss how to adjust their Situations, for want of a third Account. Then
they

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they often disagree about the Situation of Places. Thevenot, Le Valle, Sander-
 son, &c. place Cana of Galilee about
 an Hour's Journey West of Nazareth :
 Brocard and others place it about three
 Leagues to the North (or North-West) of
 Saporis, three Leagues from Nazareth :
 Phocas, between Saporis and Nazareth.
 Some place the Head of the River Aras
 (ol. Araxes) in Caucasus and the Gor-
 dean Mountains ; Chardin in Mount A-
 rarat ; Gemelli, p. 178, in the Mountain
 Mingul, at least 160 Miles West of the
 former ; and Tavernier, in the Moun-
 tains between both. Della
 Vid. Plate II. Valle places Babel near Hel-
 la ; Balbi, Eldred, Fitch,
 &c. near Bagdad ; Rauwolf and Mr.
 Mac Gregory, near Felugia ; Gemelli
 agrees with Della Valle, Tavernier,
 Chardin, &c. well enough 'till he comes
 to Tauris, but from thence to Ispahan
 he makes the Distance twice as great as
 the others have done ; and tho' Lar, if
 we depend on Thevenot and Della Valle,
 (who observ'd the Lat.) must lye conside-
 rably nearer Bender-Congo than Bender-
 Abassi, (both on the Persian Gulph) yet,
 by Gemelli's Account, it seems
 * Sepul. of the to be at a much greater Di-
 Ant. P. 35. stance. * Mr. Mac Gregory's
 accurate.

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accurate Description of the Tower of Babel, and the Antiquities about it, unobserv'd by former Travellers, proves how little curious they have been in the Search after Antiquities. We have no Account particular enough of the Ruins of Cascir Scirin, on one of the Roads betwixt Bagdad and Ispahan; nor had we any considerable Draughts of the Antiquities of Persepolis, before Sir John Chardin's late Account. The Ruins of Rey, near Sava in Persia, have not as yet been visited by any Traveller; and Gemelli blames those that went before him into the East-Indies, for not having had the Curiosity to go see the Ruins of the Pagod of Salset, near Goa, and particularly Della Valle, tho' (if I remember right) that curious Traveller gives an Account of it. I might also have given Instances of the Incorrectness of Abulpheda's, Ulug Begh's, Tavernier's, &c. Persian Tables, by shewing (as the judicious Reland has observ'd of Ptolemy's) in drawing Maps from them, how confusedly and out of Order Places would fall, some in Armenia and Turkey, that belong'd to Persia, others in the adjacent Seas, that should be within Land, and vice versa: But these Things, which should have been more than barely hinted in that Place, would have
b *swell'd*

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swell'd it beyond my intended Brevity, which I fear is already too much transgress'd.

That a Treatise of Maps is much wanting, appears by the Fondness with which the Publick seem'd to embrace any Thing upon the Subject, in the Reception Alingham's met with; and therefore it would be needless to bring any other Proof of the Usefulness of it. But some that will grant me this, may yet think the Appendix to be a Transgression of my Intention to insert nothing but what immediately related to Maps and Globes, and consequently that it is more than is needful. But I conceive the Book would be imperfect without it; for, after instructing the Student how to draw Maps, what can more necessarily follow, than Rules for making them correct, by warning him of the Defects of former Geographers and Travellers, and directing him to the best Helps for performing the same? Nor is what I have said, with Reference to the making a Geographical History or Dictionary a bit the less to the Purpose, in my Opinion, they being all alike a Geographer's Province, and dependent on one another.

If something of this Kind had been done before, there had probably been a Stop put, ere now, to that Swarm of
spurious

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spurious Maps that are abroad; and a compleat System of Geography, notwithstanding the many that have been of late set forth, had not been a Thing yet to be done. But as Geography is a Subject that often employs Writers, this may not come unseasonably, with respect to future Productions; at least it may give the Hint, as it does Room enough, to some capable Hand to pursue the Design as it ought; and I shall rest satisfy'd with having led the Way to so useful an Enterprize.

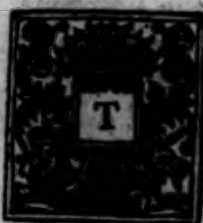
I am sensible there needs an Apology for the whole, especially for this latter Part, which was done in a Hurry, and at a Distance from the Town, where I wanted the Helps which a few Notes and a Memory none of the best could not afford; and therefore, being only a Collection of off-hand Thoughts, the whole is neither so coherent, nor well digested, as I could wish. But the Author hopes, whatever Censure the Thing may justly deserve for its Faults, that the Reader will consider there is something due to endeavouring well; which, and the Desire, more than the Ability of serving the Publick, is all the Merit he pretends to.

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This Treatise was intended to have been prefix'd as an Introduction to two large Volumes of Travels in Folio; but I chose rather that it should make a less considerable Figure, and be more serviceable; for I consider'd that would prevent its coming into the Hands of many, and frustrate the End of my Design, which was, (however it may prove) that the Price should not obstruct the Sale of it.



*An ADVERTISEMENT concerning
the Maps belonging to this Treatise.*



THE Maps annex'd to the Schemes, being only Specimens, and so small, it must not be expected they should undergo the Test of the Rules laid down in the Appendix, except *That*, Plate the 11th, which is design'd, in some Measure, for an Example to them. It represents a Draught of the Country intercepted between the Rivers *Euphrates* and *Tigris*, about *Bagdad* and *Felugia*. The Remarks in the Map, explain what belongs to it; only I shall observe, that tho' my Meaning, Page 153, is, that Roads only thro' the more obscure Parts, (as of *Tartary*, *Siberia*, most Parts of *Africa* and *America*) should have the Authors subjoin'd to the Distances; yet, since I saw *Reland*, I think it proper that they should be no where separated, unless some Way can be contriv'd by various Lines, as in the Map, to distinguish each Author's Travels; in which Case there will be a Necessity for inserting only the Distances.

Tho', in Compliance to the Travellers which we have follow'd in the Map, we have plac'd *Babylon* towards the Middle of the Plain; yet

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we are sensible it had quite a different Situation; which we are inclin'd to believe was whereabout *Felugia* now lies, as the most judicious Travellers agree, and *Rauwolf* proves, amongst other Reasons, from the Remains of the old Bridge, to be seen in his Time. However, as we are assur'd, from the Testimony of the Antients, particularly *Herodotus*, *Strabo* and *Pliny*, that the *Euphrates* ran thro' the Middle of it, and consequently that what lies on the East Side of the River, is but one Half of the Ruins of *Babylon*, we cannot but wonder that even the best Travellers should place them all on one Side of the River, without ever having it in their Thoughts to look for it on the other.

'Tis likewise observable, that almost all Travellers place the Tower of *Babel* a little on this Side *Bagdad*, (Seven or eight Miles, as *Fitch* and *Cesar Frederick* avouch; twelve according to *Herbert*; three Hours Journey West North-West of it, says *Boulay de Gouz*) about *Karcuf*, where we situate it, because it must be the same which *Balbi* calls *Carcuf-rare Nemerou*, and *Boulay de Gouz*, *Nemrod*, Names by those Authors given to *Babel*: But *Rauwolf* places it just without the Ruins of *Babylon*; which Account I the rather prefer, both in regard *Rauwolf* seems to have been best acquainted with the antient Geography; and also that *Teixira*, who pass'd by *Karcuf*, mentions it only as the Ruins of a City and Mosque; but especially because it agrees with the Situation Mr. *Mac Gregory* gives it; not to mention how far *Tavernier's* Account seems to favour it, who says,

it

Concerning the MAPS.

it lies at a Distance almost equal between *Euphrates* and *Tigris*; and yet I must own, the Names he gives it of *Agartanf* and *Nemrod*, rather infer a Mistake in his Computation, than make against the others: But the Truth is, the Natives themselves, at present, are so very ignorant, and divided about their Situation, that if a Traveller ben't skill'd enough in Antiquity to know where to look for it himself, he may be easily impos'd upon. Thus we find *Della Valle* wandering I know not how far out of the Way in quest of *Babel*, and at last supposes he has found it within half a Mile of the *Euphrates*, near *Hella*. However, we are oblig'd to him for having discover'd to us an Antiquity great enough to vie with *Babel*: No doubt it had its Rivals in after Times, tho' mention'd in our Histories no more than the City *Sendia*, whose Ruins *Balbi* observ'd much about the Place where *Rauwolf* puts *Babel*.

As often Travellers, by their Disagreement, confound, so frequently the help they give one another, is owing more to Chance than Design. Thus, with respect to *Rousvania*, for any Light we have from *Thevenot*, who only mentions it occasionally, as the Place to which the *Euphrates* is Navigable, we might as well conclude it lies below *Hella*, as any where else: But then *Della Valle* puts us something in the Way, by mentioning it in his Journey from *Bagdad* to that City: On the other Hand, we should not know that it lies on or near that River, (*Della Valle* being silent) but for *Thevenot*. Again, in drawing

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the Road from *Teixira*, betwixt *Musajeh* and *Kufa*, we could not justly guess at, what Distance to place *Kufa* in respect of *Hella*, if it was not that *Della Valle* accidentally observes, that *Ezekiel's Tomb* (in the Road three Leagues from the former) lies about half a Days Journey off the latter; where we have plac'd it, notwithstanding our being aware of what that Author says, that it lies

on the *Chabor*; but that River which falls into the * *Euphrates* near *Rabba*, being at so great a Distance out of the

* *Nub. Geog.*
Ravn. Balhi, &c.

Way, and *Teixira's* Account concurring, we suppose that he took that Part of the Information from *Rabi Benjamin*, vulg. *Benjonas*; for it may be the true Tomb of the Prophet is there, but it has its Counterfeits, as well as *Babel*; for besides the Tomb which *Benjonas* saw at the Confluence of the *Chabor* with *Euphrates*, and that near *Kufa*, it seems there is another shewn for his, on

* *Sepul. of the*
Ant. p. 21.

the other Side the *Tigris*, 30 Miles South-East from * *Bagdad*, having the Name of the River hard by, which is call'd *Chobar* or *Kebar*, to countenance it.

Authors disagree no less about the Distance betwixt the two Rivers, or from *Felugia* to *Bagdad*, which (we may suppose) lie in the narrowest Part of the Plain. *Newbery* and *Eldred* were 13 Hours travelling it over; *Fitch* calls it a Days Journey; *Casar Frederic*,

vid. *Perc. Pilg.*
Nl. 2.

a Day

Concerning the M A P S.

a Day and Half; *Balbi* and *Rawolf*, two Days Journey. Sir *Anthony Sberly* says the Distance is 30 Miles; but *Scherif Ebn Edris*, commonly call'd the *Nubian* Geographer, (thro' a Mistake the Translators were led into by a Fault in the Copy, as Mr. *Ockley* has nicely discover'd) with more Probability, reckons it from *Enbar* (which is much the same Distance as from *Felugia*) to *Bagdad*, 36 Miles. Mr. *Mac Gregory* makes it so much from the (Beginning of the) Ruins of *Babylon*, 10 or 11 Miles, as may be thence infer'd, from the *Euphrates*. *Introd. ad Ling. Orient. p. 145.*

Balbi observes, that about half a Days Sail before he came to *Felugia*, (which may be computed much about the Distance of *Enbar* from thence) he saw a River, which is probably the River he afterwards cross'd in the Way to *Bagdad*, notwithstanding he says the first came from the *Tigris*, and this goes from *Euphrates* to it; perhaps by a Mistake very common in Travellers. *Sepul. of the Ant. p. 28.*

I make no Doubt but this must be the Canal mention'd by all the Ancients, *Herodotus*, *Ammianus Marcellinus*, *Strabo*, and the rest, cut by *Nitocris*, Queen of *Babylon*, and repair'd by *Selucus Nicanor*, &c. to join the two Rivers; (for however the Easterlings may let other Things go to Ruin, they preserve and keep in Repair their Canals, Conveniencies they are particularly fond of, and into which, as *Tavernier* observes, they have cut all the Island between *Bagdad* and *Carna*, where the Rivers meet

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meet near *Bassora*.) But I am at a Loss to know where it falls into the *Tigris*; tho' because *Balbi*, &c. says at *Bagdad*, I have made it enter there, notwithstanding it's probable 'tis somewhat lower; but I won't say it is that Joining of the two Rivers which Mr. *Mac Gregory* makes 30 Miles from *Babel*, or that Division of the *Tigris*, as *Tavernier* calls it, a Day and Half's Journey from thence, and a little below *Bagdad*, as *Thevenot* also intimates: But *Della Valle*, who went down the *Tigris* two Days Voyage, as far as *Aiovan Kefra*, mentions no such Division, or Confluence; nor indeed should we be certain there was any such Conjunction or Division of the Rivers betwixt *Bagdad* and the said *Cornu*; but for the curious *Balbi*, who is the only Traveller, I know of, that went down the *Tigris*, and hath observ'd it, but it is at too great a Distance from *Giovan Chesera*, as he writes it, to be but a Day and Half's Journey from *Babel*. This, with respect to the Place where the *Tigris* divides; now let us examine where the Branch meets the *Euphrates*. *Rauwolf* says, that a little below *Traxi*, (the ancient *Apamia*, as he thinks) two Leagues from *Babel*, (out of the Road) the *Euphrates* and *Tiger* meet. *Tavernier*, in his Catalogue of Cities, insinuates that this Confluence happens near *Dourac*, at a Place call'd *Hella*; but such a Particular could not have escap'd *Della Valle*'s Notice, who was at that City, if it were really so. How then should we pretend to have express'd that Division in the Map?

This

Concerning the MAPS.

This may suffice to shew what Difficulties Geographers have to struggle with; tho' we have as many Travellers into these Parts, as any other; but the perfect Discovery and Rectification of these and many more intricate Points, are reserv'd for the judicious Mr. *MacGregory*, who, in that elaborate Proof of his Ability, his Account of the Sepulchres of the Antients, has given us Hopes of having the Geography, not only of those Parts, but of all the *Turks* Dominions in *Europe* and *Asia*, (which Quarter is the chief Theatre of Travels, and principal Scene of Antiquities) set in a new and clear Light. Likewise, when the Reverend Mr. *Ockley*, having supply'd History, shall think fit to give Geography his Assistance, what may we not expect from so valuable a Pen? 'Tis certain the *Arabians* were best able to give an Account of their own and the neighbouring Countries; and therefore the only Way to come to a right Knowledge of them, is by their Authors. The Light *Ulugh Begh*, *Abulfeda*, and the *Nubian* Geographer, give us into the Geography of *Asia*, sufficiently testifies this; * and we have Reason to believe that there are many other valuable Pieces relating to that noble and useful Science (to turn Mr. *Ockley's* Words to our Purpose) that remain yet untranslated.

* Proposals for
printing a 2d Vol.
of the History of
the Arabians.

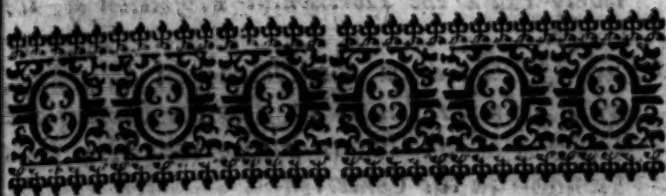
Nor must we forget the incomparable Doctor *Halley*, whose universal Knowledge, and consummate Abilities, have given that Improvement to many Sciences, which many
could

ADVERTISEMENT.

could not give to one ; and amongst the rest, Geography has not been the least Sharer ; to which his Travels Abroad, as well as Transactions at Home, have largely contributed : Nor is it likely its Obligations to that Great Man will cease here, since we are assur'd that he is now preparing, or has already prepar'd, the Materials for a new Edition of *Ptolemy*, corrected, and improv'd with the Maps both as he has done them, and as he should have done them ; (which there is no Hazard in asserting) will be that Adjustment of that obscure Author, which all Ages since have wish'd for, and the greatest Geographers hitherto have attempted in vain.



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ERRATA.

The Reader is desir'd to correct the following Faults.

Page 26, l. 5 & 6, r. $23^{\circ} 30'$; l. 13, for the Period after Cancer, put a Comma; l. 15, f. of r. if. p. 31, l. 11, after &c. insert of the Quadrant AB to 80, 70, 60, &c. l. 20, r. $23^{\circ} 30'$. p. 32, l. 26 & 29, f. from r. for. p. 38, l. 24, f. contain'd r. continu'd. p. 39, l. 10, r. Points; l. 19, r. continu'd. p. 41, l. 12. r. 10 Degrees; l. 14, f. in r. ix. p. 43, l. 11, after off r. half. p. 44, l. 23, dele be. p. 54, l. 22, f. for r. to. p. 56, l. 20, f. divide r. denote.

Errata in the Appendix.

p. 131, l. 25, r. Bleu. p. 132, l. 4, r. Mercator. p. 143, f. Lat. of Casbin 38 15, r. 36 15. p. 144, l. 16, r. wilfully; l. 19, r. arose. p. 153, l. 28, r. Fig. 11. p. 156, l. 21, r. particular. p. 162, l. 22, r. obfolate. p. 208, l. 24, after *Buchaneers of America*, r. *Ladies Travels* (a) *Bohun's Geog. Dictionary*. into Spain. p. 159, l. 28, r. *thais*, a certain (a) Author writes, that Sweden is 20 Days Journey on Horse-back in Breadth; what can any one understand by that, since, &c.

ADVERTISEMENT.

Dr. Harris's Use of the Celestial Globe, (the 4th Edition) recommended by the Author in his Preface, is sold by D. Midwinter at the three Crowns in St. Paul's Church-Yard.

As also,

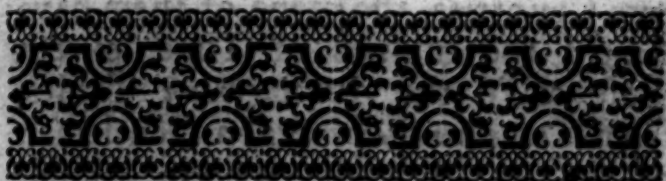
His *Lexicon Technicum*, in 2 Vols. Fol.

His plain and spherical Trigonometry, 8vo.

His new short Treatise of Algebra, 8vo.

His Translation of *Pardie's Elements of Geometry*, 8vo.

THE



THE
Construction and Use
OF
Maps and Globes.



PART I.



CHAP. I.

The Antiquity of MAPS and GLOBES.



ANAXIMANDER, the Disciple
of *Thales*, who liv'd about
400 Years before CHRIST,
is famous, among other
Things, for the Invention
of Geographical Tables,
or Maps. Without Doubt both the
Greeks and *Romans* had Maps of their
B own

own Countries, tho' none of them have escap'd the Injuries of Time, except those call'd the *Peutingerian* Tables, from *Cornelius Peutinger*, a Gentleman of *Ausburg*, to whom we are behold- ing for their Publication. Those Ta- bles contain an Itinerary of the whole *Roman* Empire; all Places except Seas, Woods, and Deserts, being put down according to their measur'd Distances, but without any Regard to Latitude, Longitude, or Bearing.

Ptolemy, who flourish'd at *Alexan- dria* under *Antoninus* the Philosopher, in the Year of CHRIST 144, by apply- ing Astronomy to the Use of Geogra- phy, which could never to any Effect be done before, and inventing Meridi- ans and Parallels, the better to demon- strate the Situation of Places, reduc'd Maps to a much greater Perfection than formerly. But since Geography began to revive in the World about two Ages ago, many new Ways of projecting Maps have been found out by Help of Opticks; as also the Nautical Chart, so useful in Navigation.

Globes, some think, have been in the World as long as Maps; and therefore attribute that Invention also to *Anax- imander*. Some will have *Atlas* to be the

the Author, the Fiction of carrying the Heavens upon his Shoulders alluding as well to this Invention, as his being a famous Astronomer. *Architas* is likewise suppos'd the Contriver of this Machine; and *Diogenes Laertijs* gives the Honour of it to *Museus*. But leaving Historians to contend for their Candidates, we hear of no remarkable Productions of this Kind, before the celebrated Sphere which *Archimedes* made of Glass, wherein were artificially represented the Motions of the Heavens; like unto which seems to have been the Sphere which *Cornelius Trebel* contriv'd, and presented our King *James* the First. Some of the like Kind in the last Age were seen among the *Germans*, *French*, and *Italians*: But what exceeds by far any Thing that ever was of this Contrivance, is the Sphere lately made by the ingenious Mr. *Rowley*, which he calls the *Orrery*, from that Noble Lord, the Great Encourager of Artificers, to whom he presented it. The Machine represents the Diurnal, Monthly, and Annual Motions of the Earth, Moon, and Sun about one another, as exact as they move in the Heavens. For a more particular Account of this Performance,

(4)

and its Excellency, read the *Englist-man*, Numb. XI. which was written on Purpose to do Honour to the Author.

But these are not the Sort we intend to treat of : The Globes we mean, are those artificial Representations of the Earth and Heavens which are commonly sold, and made Use of in Mathematical Schools.



CHAP.



C H A P. II.

Of GLOBES and MAPS in General
and Particular.

OF Globes there be two Kinds, Cælestial and Terrestrial: The first is a Representation of the Heavens, containing all the known Stars, after the Manner that Astronomers, for the easier knowing them, have divided them into Constellations, or Figures of Men, Beasts, Fowl, Fishes, and other Creatures, according to the Resemblance they fancy'd each select Number of Stars form'd. The other is the Image of the Earth in little, exhibiting all the Kingdoms, Countries, Islands, and all other Places situate upon it, in the same Order, Figure, Dimensions, Situation, and Proportion, respecting one another as on the Earth it self.

A Map is the Resemblance of the Heavens or the Earth on a plane Superficies; on which Account it falls very short of the Globe, because it can never exhibit the true Dimensions of a Spherical Body, nor the Figure, Distance, Position, and Proportion of Places situate upon it, to that Exactness: Wherefore we may say a Globe comes as near the Original as the Statue, a Map only as the Picture of a Man, the one shewing the Body in full Proportions, the other only the Lineaments of it. However, Maps have the Advantage of Globes in many Respects, which makes amends, in a great Measure, for the other Defects; for in a Map you are not oblig'd to represent the whole Earth, as you are on a Globe, but only as much as you think fit, from a Quarter of the World to a Kingdom, Province, or District of the smallest Dimension; then they are abundantly more particular, and full of Places, give a compleater View and Knowledge of Countries, are more convenient for Carriage and Use; nay, if the Place represented be not large, or do not exceed 10 or 20 Degrees of Latitude; there will be no sensible Difference in the Exactness; and lastly,

lastly, they are not so expensive, a Set of large Sheet Maps, or rather two-Sheet Maps, containing the World, the four Quarters, and each Kingdom of *Europe*, being to be had for less than half the Cost of a Pair of Globes.

For the clearer understanding of Globes and Maps, observe these general Notes; in all Globes the Equator Tropicks, Polar Circles, and first Meridian, are distinguish'd from other Circles by double, and sometimes triple Lines; the Cities and Towns are commonly represented by Gold Specks, or an O, without any other Ornament, excepting Capitals; Voyages round the World are prick'd down with Pops, and sometimes Chain Lines. For the rest look in the following Notes for Maps.

1. Maps are not always to be us'd as they lie before us to be read, for sometimes any Part is uppermost, but generally the Top is the North Part, the Bottom South, the right Hand East, the left Hand West, and mark'd with those Words, or *Latin* Words of the same Importance. There is also inscrib'd a Compass, pointing to all the Quarters of the World; the North

Part of which is known by the Flower-de-Luce.

2. The Degrees of Longitude are always number'd at Top and Bottom, sometimes by different Figures, as when the Longitude is taken from three different Places; the Degrees of Latitude on the East and West Sides.

3. In all right-lin'd and general circular Maps, except those of *Wright's* Projection, the Degrees of Latitude on the Sides are of an equal Breadth; and in all circular and right-lin'd Maps, except the said *Wright's*, and the plane Charts, the Degrees of Longitude are unequal.

4. The Longitude or Latitude being known, the Place may be presently found in a Map, by drawing a Line or Thread cross the Map both Ways, and the Point of Intersection will be the Place. In circular Maps this is found by the Intersection of the Parallel of Latitude, and Meridian of Longitude.

5. In general Maps, the Circles responding to those in the Heavens, are inscrib'd, *viz.* the Equator is express'd by a strait East and West Line, the first Meridian, the Polar Circles, the Tropicks, and the other Meridians,
and

and Parallels, which are drawn at every five or ten Degrees, intersect each other at Right Angles.

6. In several Maps there are three Sorts of Scales of Miles, according to the various Computations in different Parts of the same Country; the first is call'd, the *Magna*, whereon the great Miles are measur'd; the second, *Mediocria*, for the ordinary or middle Sort of Miles; the third, *Parva*, for the small Miles; besides which, are often affix'd Scales of other Country-Measures, as *Dutch*, *French*, *Italian*, &c. which requires Care in taking the Distances, that the right Scale be us'd, or that which you measure by, be mention'd.

7. In all Sorts of Maps, the Sea-Coasts are known by a thick Shadowing, the Sea is all white.

Rivers are mark'd by a full black serpentine Line, and sometimes by two Lines.

Lakes are denoted by irregular Lines, shadow'd inwards.

Marshes, by unbounded faint Shadows.

Sands, by prick'd Beds.

Mountains, by shadow'd Heights.

Forests

Forests and Desarts, by Trees, Elephants, Lyons, Birds, &c.

Heads of Rivers are denoted by a small Well, or very full Pop.

Bridges, by a double Line cross the River.

Roads are mark'd with a double or single Line, or with double or single prick'd Lines, strait or crooked.

Distances between Towns, by the Number of Miles in Figures, or sometimes Pops greater or smaller.

Capes or Promontories, with Heads or Points of Land running out into the Sea.

Frontiers of Kingdoms, by Chain-Lines, and sometimes large Pops.

Provinces are divided with large Pops.

Subdivisions by somewhat lesser Pops.

The Situation of a Place is mark'd with a plain o, or better, having a Pop in the Middle, to denote the exact Point, especially if the Latitude be found.

Villages, by a plain o, Castles, with the Addition of a little Flag, or thus g

Ruins of Places, with the Mark of the Castle bent or broken down, or the Flag revers'd, thus g

Great Towns, with o and a Steeple.
Cities,

Cities, with an Addition of Steeples
and Houses, according to the Bigness.

Fortify'd Places, with Angles.

Places where Battles have been
fought, by Daggers or Swords.

An Abbey is pictur'd with a Shep-
herd's Crook.

A Bishoprick, with a Cross or Mitre.

An Arch-bishoprick, with a double
Cross.

An University, with a Star or Ca-
diceus.

The Names of Villages are writ
in a Running Hand.

The Names of Towns, in a larger
Character.

Small Cities, in *Italian* Characters.

Great Cities, in *Roman* Characters.

Small Divisions of Countries, in
small Capitals.

Provinces, in larger Capitals.

And the Names of Countries, or
Quarters of the World, in large Capi-
tals of all.

In the following Construction of
Maps and Globes, I shall observe the
Method laid down in this Table.

I. Of Maps, there are three general
Kinds, divided into 15 Species.

First,

First, Circular Maps, and consequently General, under which are comprehended eight Species.

1. The Meridional Planisphere, whereof are two Sorts,
1st, The Stereographick,
2d, The Orthographick.

3. The Equatoreal Planisphere, of which are two Kinds,
1st, The Stereographick,
2d, The Orthographick.

5. The Horizontal Planisphere is of a twofold Construction,
1st, The Stereographick, with Meridian and Paralells.
2d, With Azimouth Lines.

7. The Projection of the eighth Part of the Globe.

8. Another Way to project circular Maps.

Secondly, Maps of a mix'd Projection, and may be either General or Particular.

1. Whose Meridians are Right Lines, and Parallels Arches of Circles.

2. Whose

2. Whose Parallels are Right Lines,
and Meridians Curvilineal.

Thirdly, Strait-lin'd Maps, which are,
or ought to be, Particular.

1. The ancient Way of laying down
Places by Course and Distance.

2. The Plane Projections, commonly
call'd the Plane Chart.

3. The Plane Projection, much in
Use for Particular Maps.

4. The Nautical Planisphere, com-
monly call'd *Mercator's*, or the true
Sea-Chart.

5. A new Method for projecting
particular Maps.

II. Of Globes, there are two Sorts.

1. Whose Convex is grav'd,
1st, The *Terrella*, or Magnetical
Globe.

2d, Copper or Ivory Globes.

2. To whose Surface are apply'd
grav'd Papers, such as common Ven-
dible or Paper Globes.

C H A P. III.

*Some previous Perspective RULES;
whereon depends the Construction of
most Sorts of MAPS.*

THE Construction of MAPS, especially Circular, depending chiefly upon Perspective, I shall previously exhibit: so much thereof, as may seem necessary in grounding the Student in the Nature and Fundamentals of Maps.

The Art of Perspective teaches to represent, in a Plane, all Objects in their natural Situation, as they appear to the Eye: In doing which, these three Things are to be observ'd, 1. That to the Eye may be assign'd some certain Point of Position, from whence the Object may be distinctly view'd, whether it be fram'd in the Imagination, or do really exist to the Sight. 2. An infinite Plane, call'd, the Plane, Table, Glass, or Diaphanous Medium, (which Names

Names are indifferently made use of in this Place, to express the same Thing) is to be suppos'd posited betwixt the Eye and the Object. 3. Lines must be conceiv'd to be drawn from all Points of the Object to the Eye; which passing thro' the *Diaphanum*, or transparent *Medium*, in certain Points, and those Points duly join'd by Lines from one to the other, shall exhibit the true Representation of the visible Object: However, the Image of the Object varies according to the different Position of the *Medium*; but here we conceive the *Medium* to make right Angles with that imaginary Line suppos'd to be drawn from the Pupil to the Centre of the Earth.

The Place of the Eye's Position must be assign'd at a certain Distance beyond the Object, according as you would represent it on a Plane; and because an Object, such as an Hemisphere of the Earth, or the Superficies of *Europe*, or any considerable Part or Kingdom thereof, being of a large Content, will afford an infinite Number of Points, from each of which it may be view'd so many different Ways: If therefore, from several of these infinite Points, in which the Eye may be plac'd at a Distance,

Distance, Rays were drawn, cutting the interpos'd *Medium* to various Points in the Object, in each Position of the Eye, the visual Rays or Lines would penetrate the *Diaphanum* in different Points, and represent a Figure different from what it was before : As when the Eye is plac'd full against the Frontispiece of a House, the Rays drawn from the Eye thro' the Diaphanous *Medium*, will therein produce one Kind of Figure, and when the Eye is mov'd opposite to some other Point, it will cause a different Appearance of the Frontispiece. The same Effects will arise in beholding an Hemisphere of the Earth, or any Part thereof, from several Positions of the Eye ; for if the Eye be posited perpendicularly over the Equator in the Air, you will have one Image or Representation of the Earth ; if in the Axis, you will have another. Wherefore it comes to pass, that as well the Equator and Parallels, as the Meridians, are differently represented ; because the Lines or visual Rays, which proceed from them as they are situated on the Globe, penetrate the transparent Plane in Points differently situated.

Thus

Thus then, according to the foregoing Rules, supposing the Eye in any of these Positions in the Air, and the transparent Table in a parallel Position to that individual Point over which the Eye is constituted, we will conceive Lines or Rays from all Points in the Superficies of the Earth to be drawn to the Eye; which passing thro' the *Medium* in certain Points, corresponding to those of the Superficies, and being connex'd by intercurrent Lines, shall exhibit a lively and natural Resemblance of all Places in the Earth's Superficies. Thus may the Equator Tropicks, Polar Circles, all the Meridians, and Parallels, Cities, Towns, Mouths of Rivers, Churches, and Houses, &c. be truly represented in *Plano*.

And because the Earth is round, therefore all the Places in the Superficies of the Earth cannot conveniently be represented in less than two Hemispheres; for Places diametrically opposite to each other, must be express'd by two different Projections; and seeing Places situated beyond the Hemisphere, will be out in Proportions, and appear very irregular, therefore the Superficies of the Earth should be

C equally

equally divided and exhibited in two Hemispheres.

In taking a perspective Draught, you should know how to diminish or magnify the Representation or Image of the Object in the Table or Glass *Medium*. For 1. The Figure of the Object lessens (the Table remaining in the same Position) in Proportion as the Eye is remov'd farther from it. 2. By so much is the Image lesser, as the Accession of the transparent *Medium* is nearer to the Eye, which must remain fix'd in the Place assign'd for it; and the nearer it is mov'd towards the Object, the greater will the Representation appear.

The Eye being remov'd from its former Situation, and plac'd over some other Point of the Superficies of the Earth, the Diaphanous *Medium* lying as it was, the Magnitude (tho' not the Figure) of the Representation will be different: Also, if the Table be mov'd in a parallel Position either to or from the Eye, the Disposition of the Parts of the Figure shall bear the same Resemblance and Proportion in every such Remove, tho' the Magnitude naturally varies: But if the *Medium* be posited obliquely, in respect of the Object

Object and the Eye, the Situation, Figure, and Magnitude of all Places will be differently represented.

In all such like Projections, the transparent *Medium* must always touch that Point of the Superficies of the Earth, to which a right Line drawn from the Eye, shall be perpendicular; and in projecting the Figure in different Magnitudes, we must suppose the Eye to be posited nearer or farther from the Earth, as the Case shall require: And upon these different Positions of the Eye, do depend the several Varieties of the Projections of Maps.

However, these Rules of Perspective are not altogether so indispensable, but that without their Help we may be able to project Maps, which shall exhibit the Proportion and Figure of Places exact enough. But this must be understood of Kingdoms or Provinces, and those too of very small Extent: For were we to describe *Tartary*, or any of the four Quarters, it will be done best by the Rules of Perspective, or the Projection of the Sphere, tho' the true Situation or Distances of Places be not represented in them.

In Maps, these three Things are essentially requisite, *viz.* (1.) That all Places have the same Situation and Distance from the great Circles therein, as in the Globe, to shew their Parallels, Longitudes, Zones, Climes, and Celestial Appearances, &c. All Maps in general perform this, that be delineated from Tables of Latitude and Longitude. (2.) That their Magnitudes respecting one another, be proportionable to their Magnitudes in the Globe: This general Maps cannot possibly perform; but in small Maps of Countries or Provinces, the Difference is not very sensible. (3.) That all Places respecting one another, have the same Situation, Bearing, and Distance, as on the Globe. The true Chart performs this and the first End exquisitely exact, but fails extravagantly in the second. Indeed, no Kind of Projection yet found out, can exhibit more than two of these Ends; nor does it seem feasible, to contrive one that may exactly answer all the three, in Regard of the great Difference there is between a Plane and a Convex Superficies; which Difference must consequently extend to all Things represented thereon.

The

The first of these Ends may be effected by Tables of Longitude and Latitude accurately enough. The second cannot be done according to perspective Rules, because the Parts of a curv'd Superficies farther from the Eye, are represented less in the transparent *Medium*, than a level Plain; yet the Inequality is insensible, supposing the Eye to be distant by an infinite Space from the Earth. The Third is perform'd only by particular Maps; nor even then, if the Country be very large, as *Tartary*; for the Error increases proportionable to the Magnitude; and consequently a Province will be represented truer than a Kingdom, a County than a Province, and so forth.

From these few, but necessary Rules in Opticks, you may easily conceive how the Surface of the Globe may be describ'd in *Plano*, and apprehend the Foundations on which all Kinds of Projections do depend. It is now Time that we come more particularly to apply these Rules, and exhibit the several Methods of performing the Construction of Geographical Maps in their due Order.



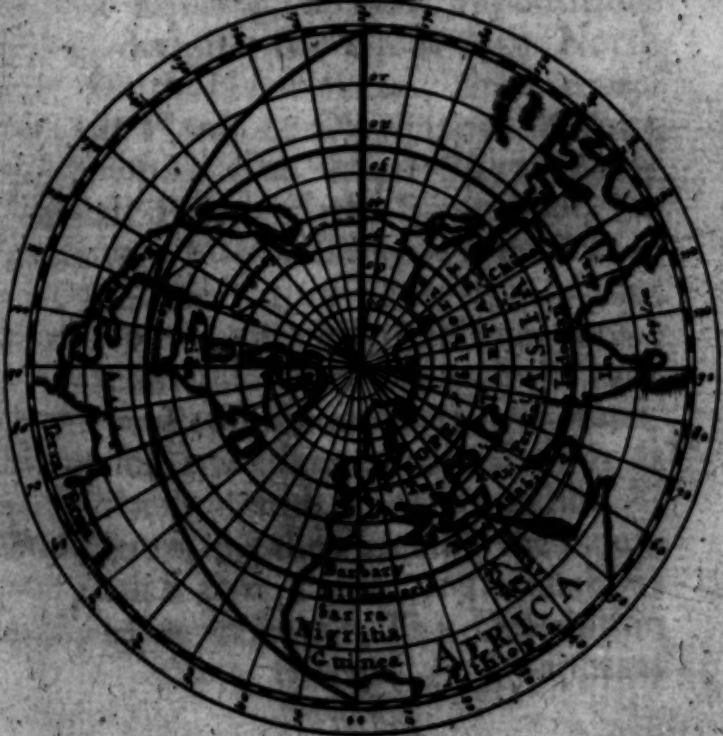
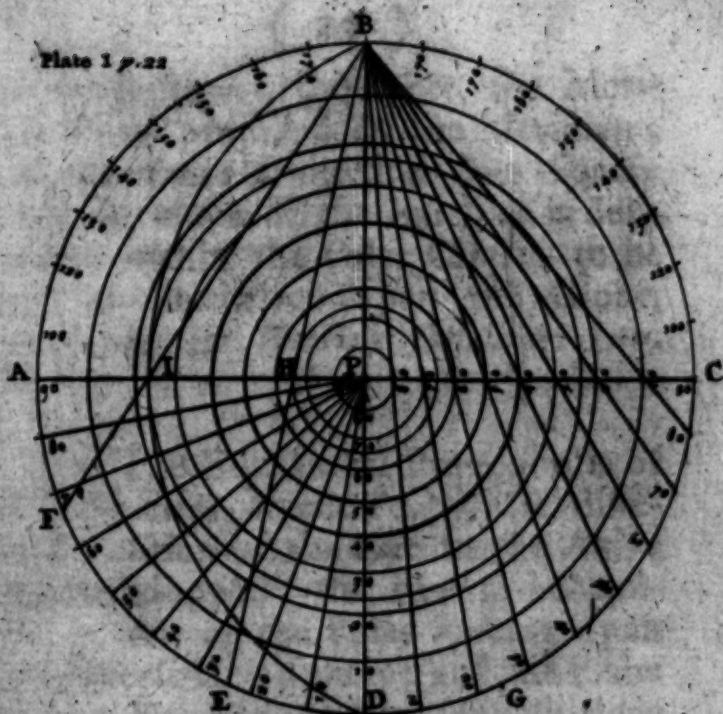
C H A P. IV.

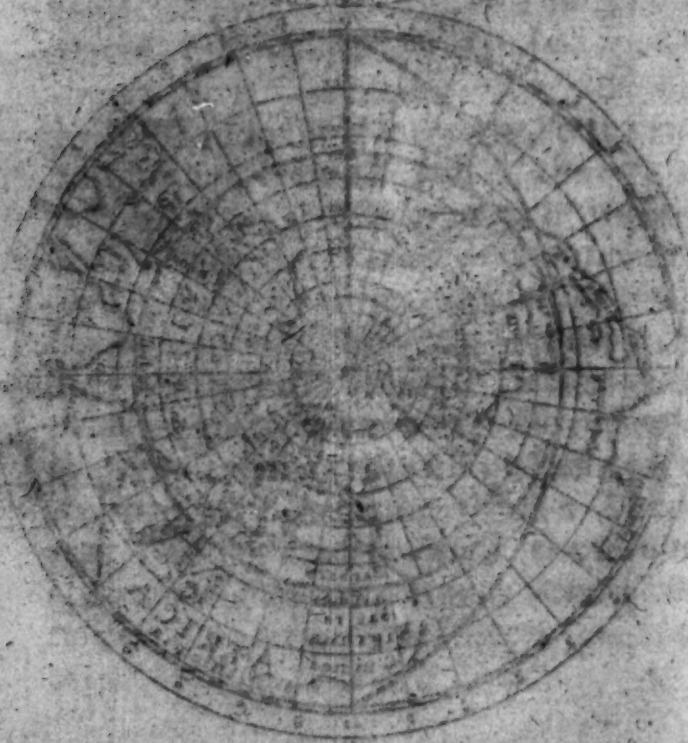
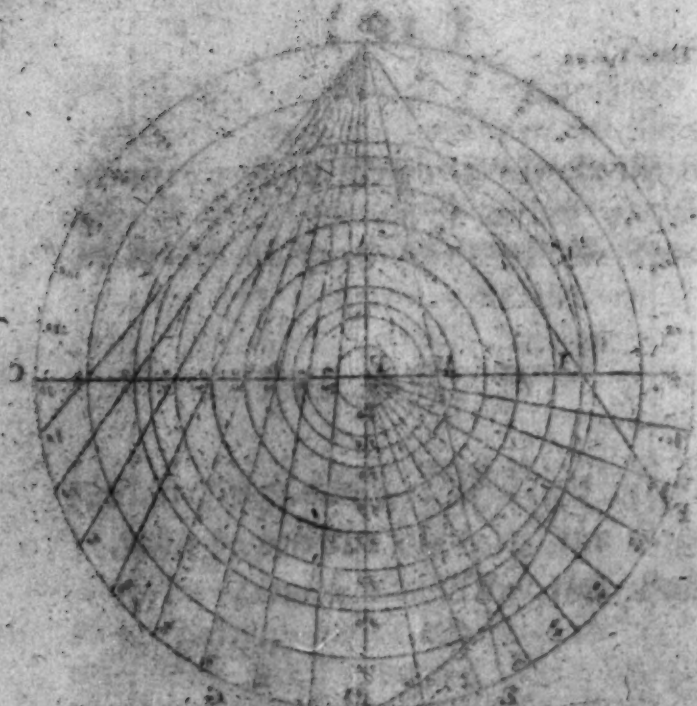
*The Stereographick Projection of the
Sphere upon the Plane of the Equa-
tor, commonly call'd, the Polar
Projection.*

Method 1. Plate 1.

SI. **T**HIS is vulgarly, but erro-
neously call'd the Polar
Projection; for, if we ad-
mit of this Denomination,
the Meridional may as justly be term'd
the Equatoreal Projection; because, in
the latter, the Eye is situated over a
Point in the Equator; and the other is
so call'd, on Account of the Position of
the Eye in the Polar Point: There-
fore this is properly call'd the Equa-
toreal, as being projected on the Plane
of

Plate 1 p. 22





of the Equator; the other, the Meridional, as projected on the Meridian; and the Polar Projection does signify only so much of the Earth as is delineated within the Polar Circles, to be laid in one Piece upon the Globe, agreeable to *Harris's Definition Lex. Tech.*

§ 2. The Equatoreal Projection is of two Species, occasion'd by the different Position of the Eye in the Axis; the first supposes the Eye to be posited in one of the Poles looking upon the obverse Hemisphere; and the Plane of the Equator, or that supposititious Plane, dividing the Globe into North and South Hemispheres, shall represent the Plane, or Diaphanous *Medium*, thro' which the visual Rays issuing from all Points of the Superficies, (to conceive which possible, we must imagine a Globe before us of transparent Glass, with the usual Delineations) being conjoin'd, will protract the true Image or Representation of the Hemisphere on the Plane; wherefore it is call'd the Stereographick Projection of the Sphere, on the Plane of the Equator, which that Plane, or Diaphanous *Medium*, represents. This Description

appears so obvious, that it needs no farther Elucidation, but what the Figure it self will afford; for if you imagine A, B, C, D, to be the first Meridian in the Globe, and B the Eye on the Surface in the Pole, looking down upon the Southern Hemisphere, A C will represent the Plane of the Equator, or Diaphonous *Medium*; the nine Divisions of the Quadrants A, D, D, C, will be the Points of the Parallels intersecting the first Meridian; and the Lines, or visual Rays emitted from them to the Eye B, will cut the *Medium* A C, as is E C in the same Points, as those Points of the Meridian in the real Globe, would cut the Plane of the Equator, or Diaphonous *Medium*; and this proves the Eye to be situated in the Pole, opposite to that of the Hemisphere to be represented.

§ 3. But now let us assume the Figure in its true Position again, wherein all the Circles, except the Ecliptick, respect the Pole as their common Center at P. To delineate which, proceed thus; from the Point of the Pole strike a Circle for the Equator, of what Circumference you please your Projection shall be

be of, as A, B, C, D, which cross with two Diameters. P D the half of the Diameter B D, let represent the prime Meridian; A P and P C the two Meridians, 90 Degrees distant from it East and West. Thus the Equator being divided into four Parts or Quadrants, subdivide each into nine, and every of those Parts again into ten more, if the Largeness will admit; and from the Point (of the Intersection of the first Meridian) D, number every tenth Degree with Figures on the right Hand and on the Left 'till they meet in the opposite Point B 180; so will the Map be divided into East and West Longitude. Then from the Pole draw right Lines to every such tenth Degree in the Equator, as you observe is done to the Quadrant D A; which will represent the Meridians, and the Figures will shew the Longitude,

§ 4. To delineate the Parallels of Latitude; from B draw Lines to every tenth Degree of the Quadrant C D; and where they intersect the Semidiameter P C, thro' those Points must Circles be describ'd from the Center P, and then number'd from the Equator towards the Pole with 10, 20, 30, &c, as you see

see in the Figure. Thus you have the Meridians and Parallels projected; and seeing the Polar Circles and Tropicks are but Parallels at a certain Distance from the Pole and the Equator, viz. $23^{\circ} 30'$; therefore set off $23^{\circ} 30'$ on the Equator from D to E, as also from A to F; then thro' the Points H and I, where the Lines BE and BF intersect AC, describe double Circles, to distinguish them from other Parallels. So shall PH represent the Arctick Circle, and PI the Tropick of Cancer. If you describe the Northern Hemisphere, and the contrary Circles of the Southern, the Semicircle of the Ecliptick may be delineated the same Way as on the Globical Papers.

§5. The Lineaments of your Map being projected, Places may be inserted, by Help of a Table of Latitude and Longitude; or all Things may be readily transferr'd upon it, from a correct Map after this Manner: According to the Table, or Map, find the Meridian of Longitude in the Semicircle B, C, D, if in Eastern; or in the other half of the Equator, B, A, D, if in Western Longitude: Next find its Parallel of Latitude on that Meridian, and the Point of

of their Intersection will be the true Situation of the Place; where make an o for the Mark, and write down the Name, whether Town, Cape, Island, &c.

§6. If a right Line be drawn between any two Places in this Kind of Projection, that Line shall represent an Arch of a great Circle, passing over the Zenith of both Places, and shall also shew the Longitude and Latitude of all such Places as it cuts, so exact as on the Globe: But the mutual Bearing and Distances from one Place to another, (which is the third End of a Map) cannot always possibly thereby be known. They are also attended with another great Inconvenience, viz. That Countries are not therein represented in their respective Magnitudes, because the Parts near the Equator take up more Room than proportionably they should; but then the Facility of laying down Places, partly supplies this Defect; for there are few inhabited Places near the Poles, but many near the Equator.

§7. *Asia* and *Europe* are best represented by this Projection; the Frigid Zones,

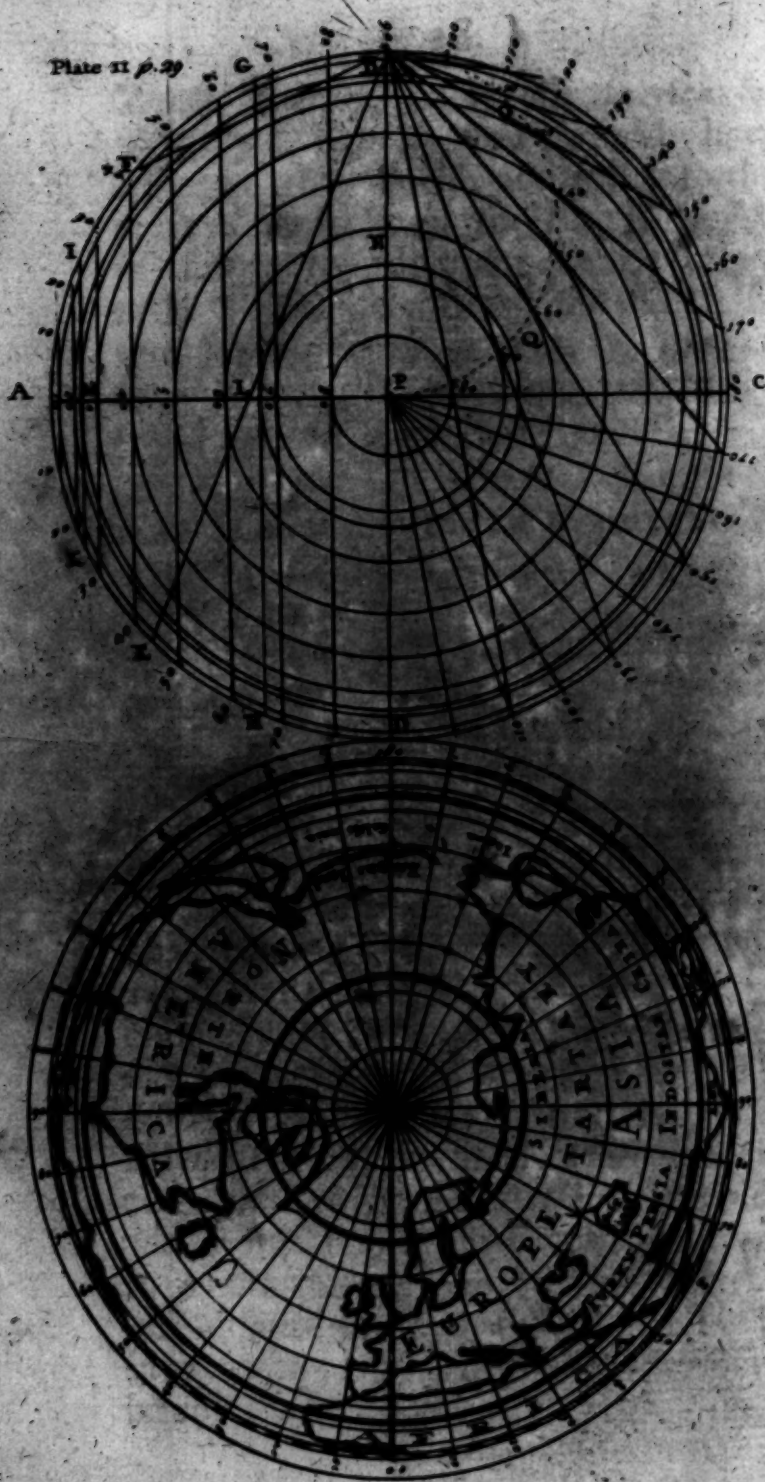
Zones, *Tartary*, or *North America* separately : But if you would have Maps of the World, according to the various Projections, for the Curiosity of seeing the different Figures they make ; you may draw the Earth in two Hemispheres, as well by this, as the Meridional Projection, commonly made use of.



CHAP.

27. *How and how far are the Regions of the Frigid Zones,*

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C H A P. V.

*The Orthographick Projection of the
Sphere upon the Plane of the
Equator.*

Method 2. Plate 2.

§1. **T**HE Situation of the Eye in this Projection, is suppos'd to be at an infinite Distance in the *Axis*, extended from the Center of the Earth, viz. 200 Semidiameters thereof, according to Opticks; and the Glass, or transparent *Medium*, (which we suppose to be at right Angles with this fictitious visual Ray, or Line) 100 Semidiameters from the Center, the Length thereof one Semidiameter of the Earth. But because this is impracticable, and may be apt to confound

found a Student, therefore, instead of the Earth it self, we will conceive its Representation, or the Mathematical Globe, whereof, if the Diameter be two Feet, the Eye must be posited 200 Feet distant from its Center, the Glass or *Medium* 100, the Breadth of which will be one Foot: And hence arises the different Figure of the Earth in these two Kinds of the Equatorial Projection; for by Reason of the Eye's Position in the former, the Optick Rays, or Lines, do so cut the interpos'd *Medium*, as that the Parallels are so much the farther asunder, by how much nearer they are to the Equator: On the contrary, in this Projection, the Eye, because of the Globe's Convexity, is suppos'd to be at an infinite Distance, before it can distinctly perceive the Equator; and consequently the Places about the Poles, which may be discern'd at any Distance, will have a larger Projection than those nearer the Equator; which gradually grow less perceptible, as they approach to it.

§ 2. In this Projection the Equator must be drawn and divided, and Meridians delineated, as in the third Section

on of the former Chapter; which having done, proceed, as before, to describe the Parallels after this Method: A B and A D being two Quadrants, each divided into 90 Degrees, and number'd with Figures; from either Side the first Meridian A P, draw right Lines through the corresponding Degrees, or every tenth Degree of each Quadrant, as from 80, 70, 60, &c. of the Quadrant A D, parallel to the Diameter B D; and through the Points of Interfection in the Meridian A P, strike Circles representing the Parallels, numbering each with 10, 20, 30, &c. from A to the Pole P, to shew the Degrees of Latitude. To delineate the Polar Circles and Tropicks; as in the former Method, set off from B to G, and from D to H, $23^{\circ} 30'$; as also the same Number of Degrees from A to I, and from A to K; and drawing Lines between each through the Points of Interfection in the first Meridian A P, strike Circles. Thus P L will represent the Polar Circle, and P M the Tropick of *Cancer*, the Ecliptick may be projected as in the former; and so may Places be laid down by following the same Directions.

§ 3. There

§3. There are other Ways of describing the Parallels, besides that mention'd; as first lay a Rule to B, and draw Lines to every 20th Degree in the Semicircle B, C, D, as 110, 130, 150, 170, in both the Quadrants B C, and C D: Then divide each of those Lines in two, and the Points of Division will be the Points thro' which the Parallels must be drawn; or, to save the Labour of dividing each Line, divide the Semidiameter B P; and from the Point at N extend the Compass to B or P, and sweep an Arch, which will divide the Lines exact in the Middle, or cut them in the Points from striking the Circles: But the readiest and best Way of all is, without any more Trouble, to divide the said Circle B, O, Q, P, into 90 or 9 Degrees; and through every single or 10th Degree describe Circles, which will be the Parallels of Latitude; and as you go along at $23^{\circ} 30'$ from the Equator at O, strike a double Line from the Tropick, as also at $60^{\circ} 30'$ Distance from it, or $23^{\circ} 30'$ from the Pole P, describe another double Line from the Polar Circle at Q, and thus will it be quickly perform'd.

§4. This

This Kind of the Equatoreal Projection, shews the true Decrease of the Degrees of the Equinoxial in every Parallel; the Circumpolar Lands may be delineated better in this, than the former Projection; and so may *Tartary*, or the North Part of *Europe*, as *Sweden*, *Norway*, and *Muscovy*.



D C H A P.

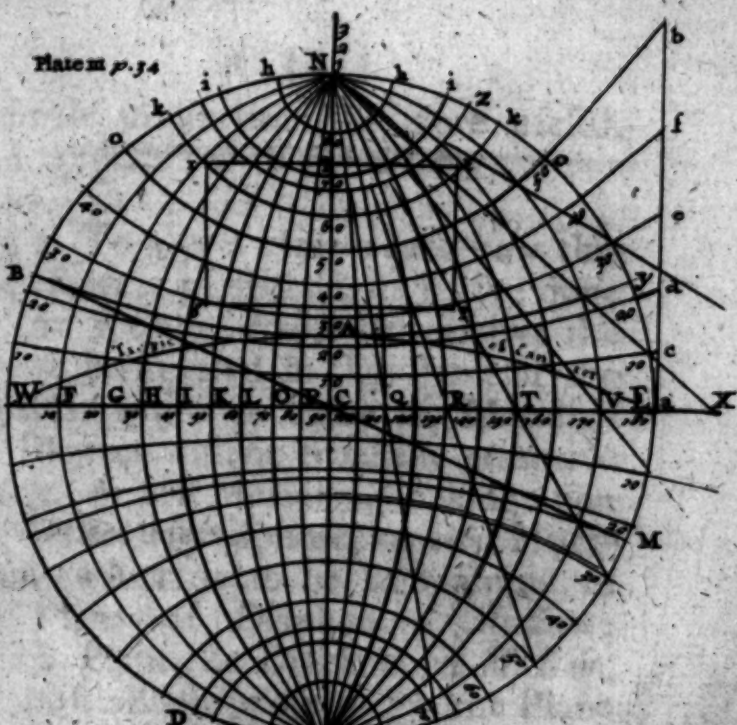


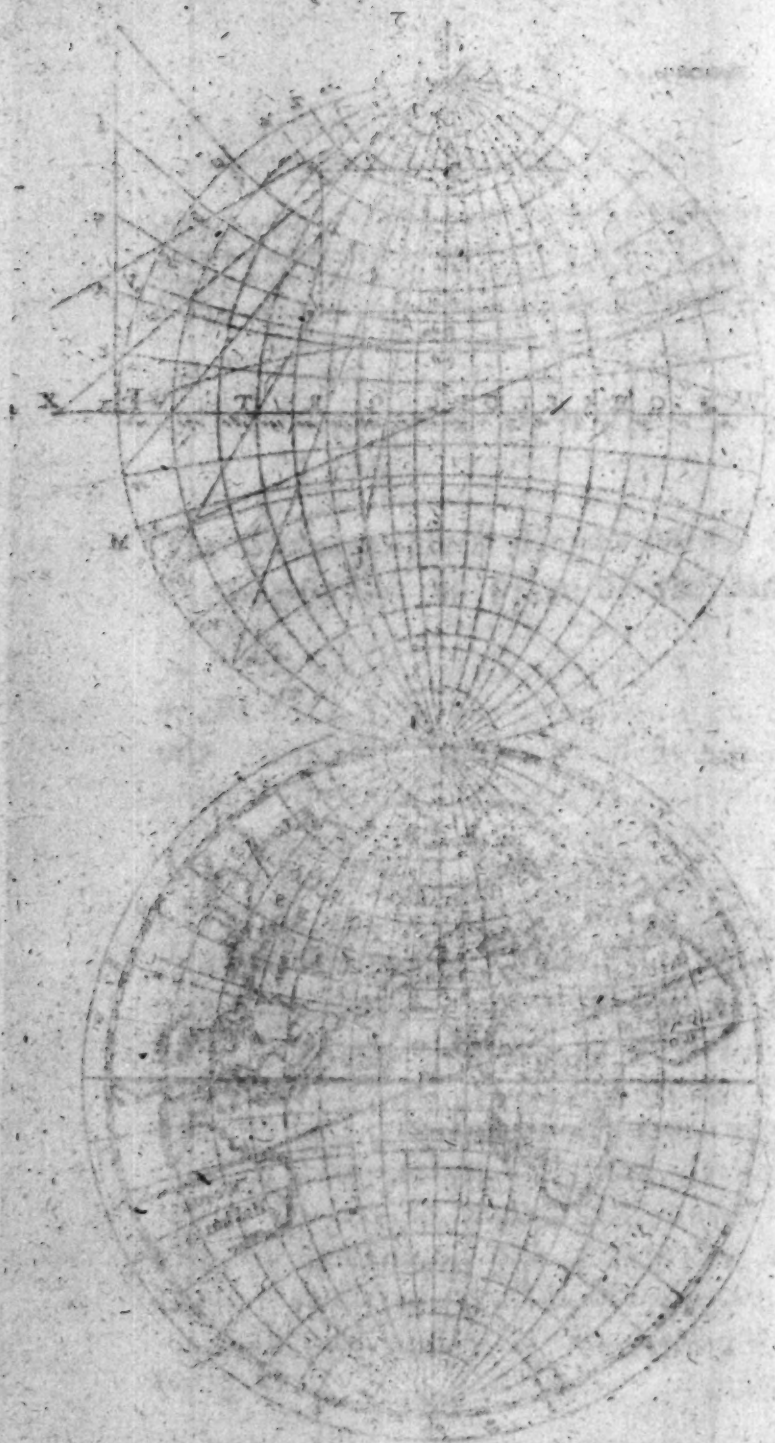
C H A P. VI.

*The Stereographick Projection of the
Sphere, on the Plane of the Meri-
dian.*

Method 3. Plate 3.

§ 1. **T**HE preceding Methods
of projecting Maps, lie
under several Inconveni-
encies, as I said before,
neither exhibiting rightly the Magni-
tude, nor the Situation of Places: Be-
sides, there is no bringing all the Pla-
ces in the Eastern or Western Hemi-
sphere, into less than two Hemispheres,
so as to express *Europe, Asia, and Af-
rica*, (or *America* by it self) in one
Map; therefore Geographers have in-
vented another Way, something more
difficult





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difficult to project, but more useful, and agreeable with the Globe.

§ 2. To give a clearer Idea how this Projection is perform'd, as I have done in the former, you must conceive the Eye to be situated in that Point of the Equator which is cut by the Meridian 90 Degrees distant from the primitive Circle, or first Meridian, looking upon the nether Hemisphere, or that Hemisphere which is to be represented in the Plane or Diaphanous *Medium*; which Plane, or Diaphanous *Medium*, we must also suppose to be the Plane of the first Meridian, dividing the Globe into two equal Hemispheres.

§ 3. In this Projection are represented the whole Meridians and half Circles of Latitude: In the foregoing, the Meridians were divided, and the Parallels were exhibited entire: The Meridians and Parallels, contrary to the former Constructions, (where the Parallels are all Circles, and all the Meridians strait Lines) are all circular, excepting the Semicircle of the Equator, which here becomes a right Line, as does also that Meridian 90

Degrees from the Prime, cutting it in the Point of the Eye's Position. These premis'd, we proceed to the Construction thereof.

§ 4. Describe the Circle N, E, S, W, representing the first Meridian; cross it with two Diameters at right Angles thro' the Center C; W, C, E, shall represent the Equator; W, the West Part, and E, the East Part; the Diameter N, C, S, will be the Meridian, 90 Degrees distant from the first; the Letters at the Extremities thereof, denote the Poles of the Globe.

§ 5. To delineate the Meridians, proceed thus: From N draw Lines thro' each 10th Degree, (or each Degree if you think fit) of the Quadrants S W or S E, which shall cut the Quadrant of the Equator W C in F, G, H, I, K, L, O, P; or, to avoid Scores in your Paper, make a Point in the Line where the Side of the Ruler cuts it; 'tis enough to divide one Quadrant, because you may transfer the Points into the Lines C N, C E, and C S, which will save the Trouble of their particular Divisions. Thus are the

the Points in the Equator, thro' which the Meridians are to pass; as also, those Points in the perpendicular Meridian, determining the Ambit of the Parallels, found out. The Centers of all those Meridians, whose Distance from the first Meridian N, W, S, does not exceed 45 Degrees, may be found in the Line CE, reckoning every second Degree from the Point C, for the Centers of each Degree, from the Point W. By the same Proportion we must take every 20th Degree, or Point from C, in the Line CE, for Centers to each 10th Degree, or Point from W, in the Line WC. Therefore Q will be the Center of F, R of G, T of H, V of I. But because the Centers of the Meridians exceeding 45 Degrees, lie without the Circumference of the first Meridian in the Line CE extended, therefore, laying the Ruler upon N, and every second Degree, or, according to the Projection, upon each 20th Degree of the Quadrant NE, make Points in the extended Line CE, which shall be the Centers of all the other Meridians, where the Edge of the Ruler cuts it: Thus X will be the Center of K, that Meridian 50 Degrees distant from the primitive,

primitive, and so forth. *Note*, when, to avoid Prolixity, I say, X, (or any other Point nam'd by a Letter, in the Line limited or extended CE,) is the Center of some other Point or Letter in the Line WC, as K, my Meaning is, that X is the Center to that Meridian passing through K, and both the Poles where all the Meridians terminate: In like manner may the Meridians be describ'd, thro' the Points in the Line CE; if in the Line continu'd CW, you transfer the Points of the Centers in the Line CE.

§ 6. You have the Points for the Projection of the Parallels already mark'd in the Lines CN and CS; Now, to find the Centers of these Points, erect a Perpendicular at E, as *ab*; and from C, thro' each 10th Degree of the Quadrant NE, draw Lines, to cut the Perpendicular in *c, d, e, f, b, &c.* Then take the Distance C*c*, and transfer it in the Line contain'd CN from C, which will be the Center, mark'd Figure first, to the Parallel *b 80 b*; C*d* transferr'd C2, will be the Center of *i 70 i*; C3 equal to C*e*, will be the Center of *k 60 k*. So C*f* apply'd from C, on the Line extended,

tended, will be the Center of the Parallel $o\ 50\ o$; and thus, by transferring from one Line to t'other, you have the Centers of the rest of the Parallels.

§ 7. To project the Tropicks, and Polar Circles, set off on each Side the Equator and the Poles $23^{\circ}\ 30'$; then draw a Line thro' the Points from C, and transfer the Point of Intersection with the Tangent Line, or Perpendicular, into CN, as before, for the Centers of those Circles. The Construction of the Parallels of the lower Part of the Figure is done as was directed in describing the Meridians in the Line CE, viz. by transferring the Centers in the continu'd Line CN, into the Line contain'd CS,

§ 8. There are two Ways of projecting the Ecliptick: For, supposing the Center C to be the first Point of Aries, it will be represented by a right Line drawn from the Beginning of Cancer B, thro' the Beginning of Aries C, to the Beginning of Capricorn M; which being divided like the Equator, you may number thereon

The Eye positioned in the vernal Colure.

D 4 the

the Degrees of each Sign. This Division is perform'd thus: Cross the Ecliptick B M with a Line at right Angles drawn from the opposite Points of the Polar Circles in the Meridian Z D; divide the Quadrant B D into nine Parts, which are equal to those of the other Quadrants; and laying a Ruler upon Z, and upon each Division of the Quadrant cut the Line B M, as you did the Equator: But all this Trouble may be quitted, by transferring the Divisions of the Equator upon the Ecliptick Line.

The Eye posited in the Solstitial Colure. The other Way of Projecting the Eclipticks, is the same as in all Maps of the Hemispheres, where it cuts the Points of the Intersection of the first Meridian, and the Equator at W and E; and the third Point, which is the greatest *Ambit* of the Ecliptick, is in the Intersection of the Tropick of *Glancer* B A Y, with the Meridian N C S, at A. The intermediate Points may be found, as was directed, in drawing the Ecliptick on the Globical Papers by the Table of right Ascension and Declination; the Construction being ready for inserting the Places in the Maps, that may be done by Help of a Table

Table of Longitude and Latitude, as I shew'd in the foregoing Methods at the Interfection of their respective Meridians and Parallels.

§ 9. *Varenius* prescribes two Ways, how the whole Surface of the Earth may be exhibited in one Map of the Hemisphere, by continuing the Meridians and Parallels on the Equator extended, or else by dividing one Hemisphere into two Parts: Thus shall N C S be the prime Meridian, and every 10th Degree East and West thereof shall be taken for 20 Degrees, that in every 5th for 10 Degrees. But because I would not encourage the Practice of making this Projection more erroneous than it is; therefore I purposely forbear entering any farther upon the Matter, and shall proceed to shew the Convenience and Defects of this Kind of Maps.

§ 10. Its Conveniencies are these:
(1.) It very agreeably exhibits the Hemisphere, intercepted between the two Poles, with all the Parts entire, as the lower Figure shews; wherein is represented *Europe*, *Asia*, and *Africa*; which compare with the other Projections,

ons, to see the different Appearances they make, in respect of each other, (2.) It shews the Longitude, Latitude, and Distance of Places, from all the great Circles, exactly as on the Globe it self. It hath these two Defects: (1.) That the Degrees of the Equator are unequal; as also of the Meridians and Parallels, but the first Meridian; encreasing gradually, the nearer they are to the prime Meridian, and consequently the Parts about C are less, and about A C greater than proportionably they ought, In the same Manner, the Places about the Poles bear an unequal Proportion to those nearer the Equator. (2.) The Course and Distance between Places, are neither with Ease, Exactness, or Certainty, to be found in this Projection.

§ II. If you would project a Map of any particular Quarter, or Portion of the Earth, which will be less than a Hemisphere; you must make your Projection proportionable to the Extent of the Map you design to draw, and then cut out so much thereof as is terminated by the greatest Degree of Longitude and Latitude, of the Portion of the Earth to be projected:

jected: For Example, Suppose you had a Mind to draw a Map of *Europe*, according to this Construction, which being first delineated, seek in some other correct Map the greater and lesser Latitude of *Europe*, which you will find to lie between the 34 and 72 Degrees of Latitude; and through each of those Points in the Line *NC* draw Lines parallel to the Equator; and because, in the common Maps, *Europe* includes 93 Degrees of Longitude, therefore set off, *viz.* $46^{\circ} 30'$ from *n* to *g*, and from *n* to *p*, to make *gp* 93 Degrees, the Extent of *Europe* in Longitude; then erect Perpendiculars on the Points *g* and *p*, to square your Map; or to save so much Trouble, set off *ng* from *g* to *r*, and from *q* to *t*, in the Line *rt*, and cut out your Map accordingly; you may allow a little more Room in parting your Portion of the Projection from the rest, than barely is taken up by the Map, to express more clearly the Bounds and Situation thereof, in respect of other Parts.

§ 12. The Places may be dispos'd in the Map, as in the Hemisphere; but, as I said, their Distances are very difficult to be attain'd; but because nothing

thing may be wanting that is necessary, I shall here exhibit the Methods whereby the Distances of Places in this Projection may be found.

1st, If two Places lie on the Equator, the Degrees contain'd between them being multiply'd by 60, (the common Number of a Degree) will give their mutual Distances in Miles.

2dly, If the two Places lie upon the same Meridian, and both in North or South Latitude; their Difference of Latitude multiply'd by 60, will give their mutual Distances.

3dly, If the two Places lie upon the same Meridian, but in different Latitudes, that is, one North and the other South; add their Latitudes together, and the Sum multiply'd by 60, gives the Distance one from the other.

4thly, If the two Places, have both North or South Latitude, be but 180 Degrees Difference of Longitude, the Sum of the Complements of their Latitude gives the Miles they are distant mutually, being multiply'd by 60.

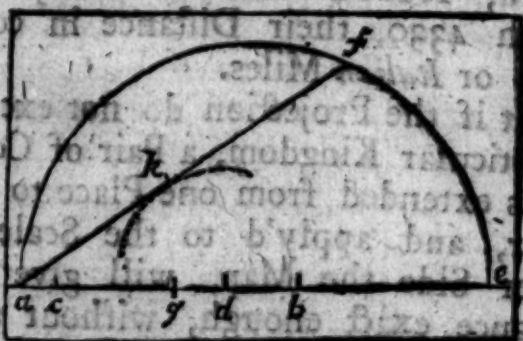
5thly, If one Place lie in the North, the other in South Latitude, and 180 Degrees be their Difference of Longitude; then the Difference of their Latitudes

Latitudes deducted from 180, and the Remainder multiply'd as afore, will give their Distance from each other in Miles.

§ 13. But if the Places be in none of these Positions, and differ both in Longitude and Latitude, the Distance between them (having their Latitude and Difference of Longitude known) may be found by working with a Scale of versed Sines, as follows.

Fig.

Suppose the Distance were requir'd between *London* in the Latitude of $51^{\circ} 30'$ North, and *Balasore* in the Bay of *Bengal* in the *East-Indies*, whose Latitude is $21^{\circ} 5'$ North, and Difference of Longitude 86.



Draw a Line at Pleasure, and with the versed Sine of 90 Degrees, strike the Semicircle $a f e$, then subtract the Sum

Sum of both their Latitudes $72^{\circ} 35'$ from 180, and the versed Sine of the Remainder $107^{\circ} 25'$ set off from a to b on the Line ae ; as also the versed Sine of the Difference of Latitude $30^{\circ} 25'$ from a to c . Lastly, from the same Scale of versed Sines take the Difference of Longitude 86, and apply it on the Diameter from a to d . This done, take the Distance bc , and lay from e to f , on the Arch afe , drawing a Line from a to f ; then take the nearest Distance k , between d and the Line af , and set from c to g . Finally, the Distance ag being apply'd to the Scale of versed Sines, will give about $72^{\circ} 10'$, the Distance between the two Places in Degrees; which, reduc'd into Miles by 60, giveth 4330, their Distance in common, or *Italian Miles*.

But if the Projection do not exceed a particular Kingdom, a Pair of Compasses extended from one Place to the other, and apply'd to the Scale on either Side the Map, will give the Distance exact enough, without any more Trouble.

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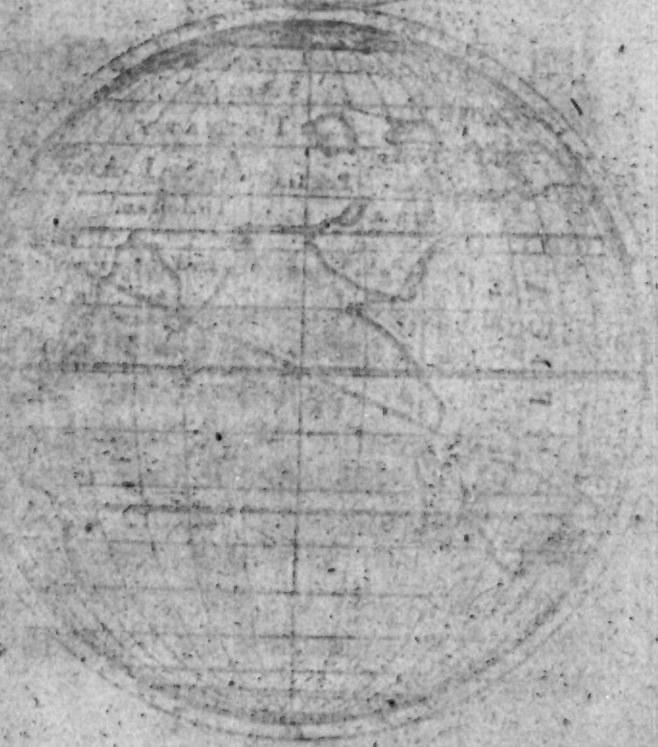
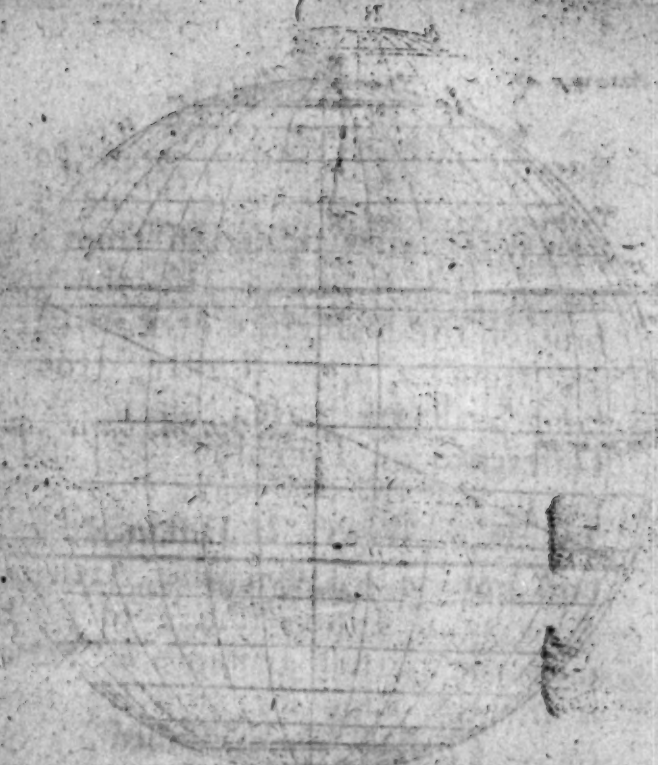
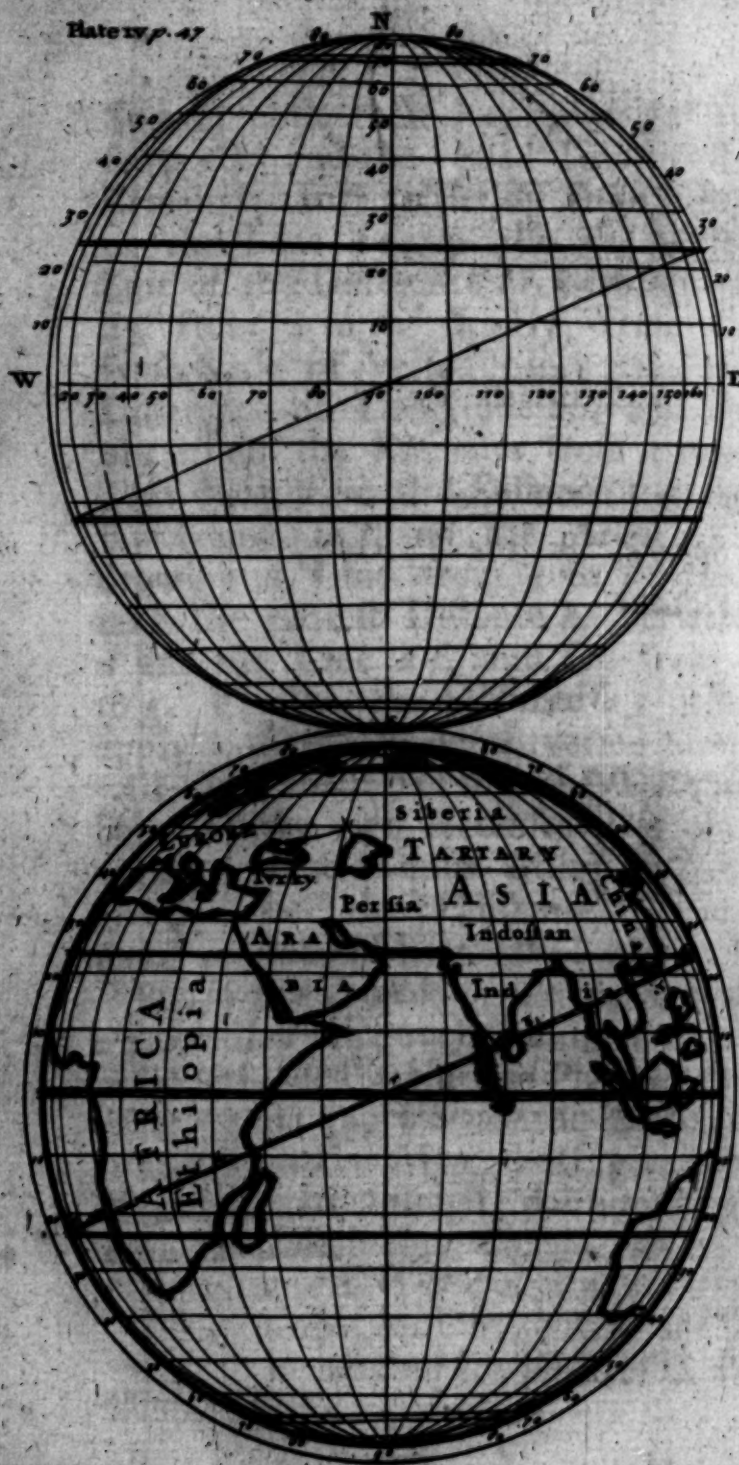


Plate IV p. 47





C H A P. VII.

*The Orthographical Projection of the
Sphere, on the Plane of the Me-
ridian.*

Method 4. Fig. 4.

§ 1. **I**N this Projection you may observe, that the Parallels of Latitude are all right Lines, and all the Meridians, excepting the first Meridian, neither right Lines, nor Arches of Circles, but Semi-Ellipses; which Construction is form'd, if, in the Plane of the first Meridian, you conceive perpendicular Lines to fall from all Points of each Hemisphere. That you may the clearer apprehend this, we will suppose ESWN the Equator; E the Place in the Equator, over which the Eye is situated in the same Manner

Manner and Distance as is shewn in the Equatoreal Projection; therefore Lines falling perpendicular from each Point in the upper Hemisphere, represented by the Semicircle *N E S*, to the corresponding Points in the obverse Hemisphere, represented by the Semicircle *N W S*, shall cut the Plane of the Meridian, or the Diaphanous *Medium*, which, in this Position of the Globe, will be *N C S*, in the same Points as the Rays drawn from the same Points in the Surface *N E S*, to the Eye in its Optick Distance would cut it; which Distances of the Eye and the *Medium*, are the same as is specify'd Chap. VIII, § 1, viz, that of the Eye (supposing the Globe's Diameter to be two Foot) 200 Foot from the Center of the Earth, and the Distance of the *Medium* from the Center 100 Foot.

§ 2. The Meridian *N E S W* being divided, as in the former Method, into four Quadrants, and each Quadrant into 9, or 90 Parts; from each 10th Degree of the Quadrants *N W* and *W S*, draw Lines to each responding 10th Degree in the Quadrants *N E* and *E S*, parallel to the Equator *W E*, which

which will represent the Parallels of Latitude; and having number'd each Parallel on the first Meridian, and in that N S 90 Degrees distant from it, transfer the Points of the Parallel's Interfection from C N or C S, into C W and C E, which shall be the Points in the Equator thro' which the Meridians must pass, and number them likewise from W, (where the first Meridian cuts the Equator) towards E, for Degrees of Longitude.

Then seeing the Meridians are Semi-Ellipses, you may describe them thro' the given Points, *viz.* The Poles, and the Divisions of the Equator W E, with Oval Compasses; or by Help of a Sector, you may find the Points in each Parallel of Latitude, thro' which the Ellipses may be form'd, if drawn with a free Hand: The Eliptick in this Projection will be represented by an Eliptical, or else a strait Line, in the same Manner as is set down in the former Method, but with less Trouble or Difficulty.

The Maps of this Construction have this Advantage above the preceding Methods, namely, that they exhibit the true proportional Decrease of the Degrees of the Equator in each Parallel

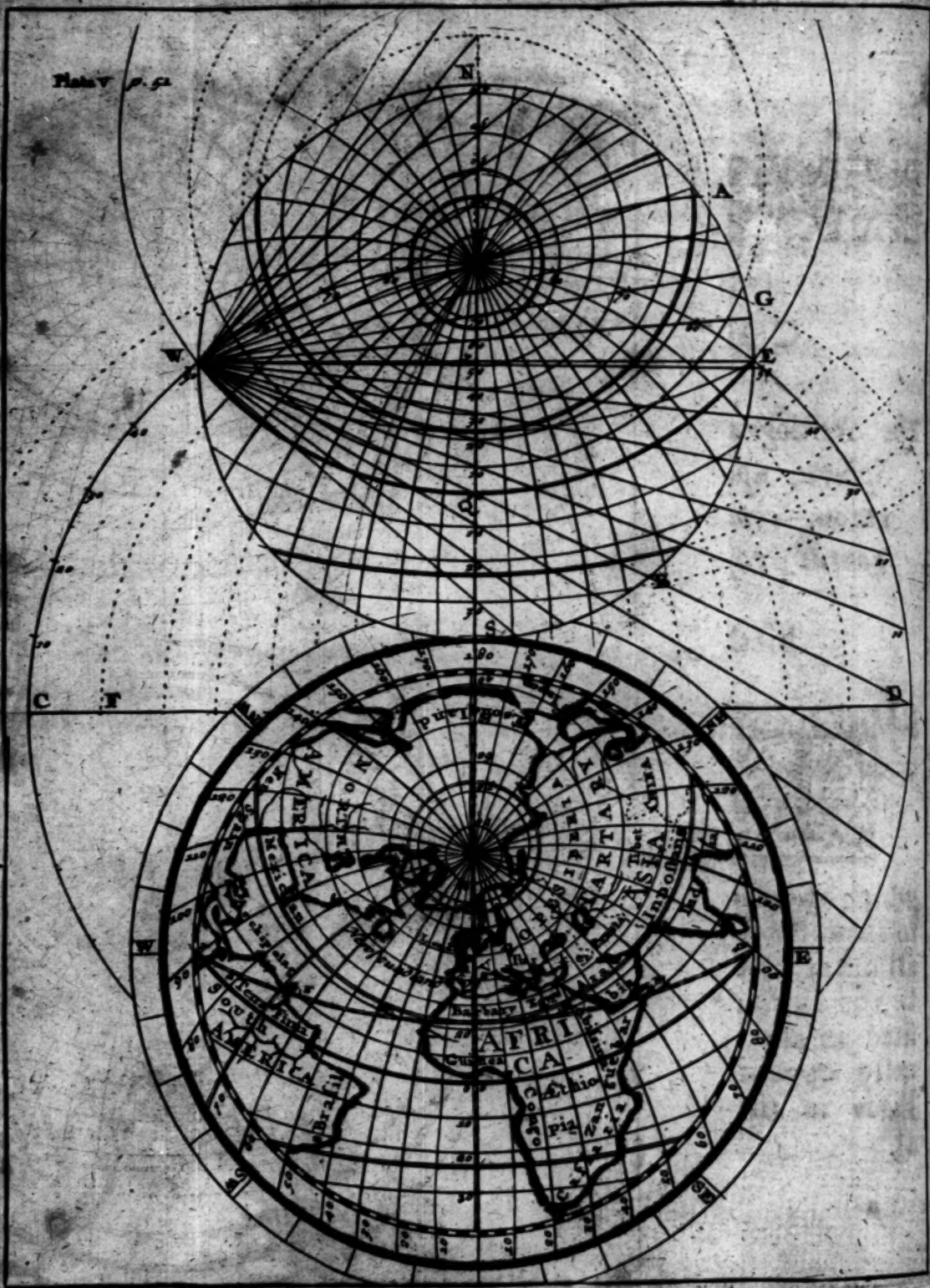
rallel, (representing the Figure of the Globe, plac'd before us in a Parallel Position.) But then that Convenience brings with it a great Inconvenience, causing too great a Contraction of the Meridians, the nearer they lie to the first, to express any Thing of Places, and consequently makes this Projection unfit for general Maps. *Africa* is the only Quarter that would nearly retain its due Figure and Dimensions, if drawn by it self.



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Planus p. 51





C H A P. VIII.

The Stereographick Projection of the Sphere, upon the Plane of the Horizon, commonly call'd; the Horizontal Projection of the Globe.

Method 5. Plate 5.

§ 1.  HERE is greater Variety in this, than in any other Projection. The Place where we are, is the Center, from which the Design of this Projection is to shew the Distance and Situation of all other Places. The out Circle will be the Horizon; the Eye will be posited in the *Nadir*, or Point, diametrically opposite to the *Zenith* of the Place in the Center; the Plane, or

E 2 diaphanous

diaphanous *Medium*, will be the Plane of the Horizon, cutting the Globe in two equal Hemispheres, thro' the Center, at right Angles with that fictitious Line, drawn from the Eye to the opposite Point, or Place where we are: Thus Rays drawn from the Eye, to each Point in the Hemisphere below it, shall project Points in the Plane, or transparent *Medium*, having the same Situation, which, if join'd by Lines, will give the true Representation of that Hemisphere. The antient *Jews*, conceiving *Jerusalem* to be situated in the Center of the Earth, made Use of this Projection; as do the present *Chinese*, who cherish the like vain Opinion of their Country.

§ 2. The Construction is as follows. I shall begin with the common Way: Suppose it be requir'd to describe an Horizontal Projection for the City of *London*, in the Latitude $51^{\circ} 30'$, from whence, as the Center, the Course and Distance of all other Places may be exhibited; first, assume any Point in the Paper to be the Center for *London*, as *Z*; and strike the Peripherie *N E S W* of what Extent you think fit;

fit; quarter it, and divide each Quarter into 90 Degrees, or, for the present, to avoid Confusion, divide only one Quadrant NW, or WS. The Diameter NS let be the first Meridian, WE the prime Vertical, or *Azimuth* of East and West. Secondly, take $51^{\circ} 30'$ from the divided Quadrant NW, and set from N to A the Latitude of *London*; then draw a Line from W to A, and where the Ruler cuts the Diameter NS, make a Point, which shall represent the Artick Pole mark'd P. Thirdly, take the Distance of the Arch of any of the Quadrants, as NE, and set from A to B, and where the Line WB cuts the Diameter NS, that Point Q will be the Point of the Intersection of the Meridian with the Equator. Fourthly, divide the Semicircle N A E B S, from B, into Degrees, the same in Proportion to those of the Quadrant NW; and from W to each, or each 10th Degree thereof, lay a Ruler, and mark where it cuts the Line NS, for there will be the Points of the Intersection of the Parallels with the first Meridian, which fall within the Peripherie of the Projection. But if you would

find the opposite Point of each Parallel, in order to delineate them easily on the Projection, continue the Division of the Peripherie from the Equatorial Point B, upon the Quadrant N W, and draw Lines as afore, thro' each Point, to cut the Diameter N S continu'd; then describe Circles thro' the Points of equal Degrees, from the Pole P, *viz.* thro' 80, 70, 60, &c. in the Line P S, and 80, 70, 60, in the Line P N extended: Thus may all the Parallels, Tropicks, and Polar Circles be projected.

§ 3. In the Construction of the Meridians, the same Method directs thus: First, thro' the three Points W, P, E, strike a Circle, the Half of which is the Semicircle C, P, D, and delineate thereon the Meridian Projection, by dividing it into 360 Degrees; then drawing Lines for each Degree, or 10th Degree, from P; and lastly, describing Circles from the Centers found in the Line CD, continu'd at both Ends, thro' the Division in the Diameter W E, and the Poles, after the same Manner as is set down in Method 3. (which will direct you) the

the Parallels excepted, which must not be drawn. In describing the Meridians, observe to draw each thro' the Pole, to touch the Horizon, which will be the Meridians North of the Pole. Thus when you describe the Meridian F P, describe at the same Time F, P, G, the like must be understood of all the rest.

§ 4. But because 'tis somewhat preposterous and irregular to raise the Foundation upon the Superstructure, that is, to describe the Meridional Projection last, which should be first, as being properly the Basis of the Horizontal; therefore I shall substitute another Way, far more easy, and agreeable to the Principles of the Projection.

§ 5. Describe a Circle of any Radius for the Meridian, the Half of which let be C, P, D, (wanting Room in the Figure annex'd to strike the whole) divide it, as usual, into four Quarters, and each Quarter into 90 Degrees, C D will be the Equator, P S continu'd to the Nadir Point of the Circle, shall represent the first

E 4

Meridian

Meridian in the Horizontal Projection, or North and South *Azimuth*. Secondly, from D to E, on the Quadrant P D, and from C to W, in the Quadrant P C, set off $51^{\circ} 30'$ for the Latitude of *London*, and draw the Line W E, which will be the East and West *Azimuth* of the Place; the Point of Intersection of the Line W E, with the first Meridian N P S, shall represent *London* mark'd $\propto$; from which as the Center of the Projection, strike the Peripherie N E S W thro' the Points W E, representing the Horizon of *London*. P the Pole in the Meridional Projection, shall be the Pole in the Horizontal; and the Arch of the Primitive Circle C P D, passing thro' the Pole P, and the Points W E, shall divide that Meridian distant 90 Degrees from the Meridian of *London* N Z S. This done, proceed, thirdly, to describe the Meridians on the Meridional Projection, (as is directed Chap. VI, § 5,) minding to draw them thro' the Pole without the primitive Circle C P D, to touch the Horizontal Circle N E S W; as you may apprehend more clearly by the Figure,

Having

Having delineated the Meridians, you come next to project the Parallels. Lay a Ruler upon W, and move it to every Degree, or each 10th Degree of the Meridian P D continu'd, marking where it cuts the Meridian N S, which are Points thro' which the Parallels are to pass on this Side the Pole : Then (in regard they have no common Center) to find the opposite Points, or the Points thro' which the same Parallels are to pass on the other Side the Pole in the Meridian N S, (which must be extended for that Purpose) move the Ruler still along to each Degree, or 10th Degree of the Meridian P C continu'd ; and where it intersects the Meridian N S, will be the opposite Points thro' which the Parallels are to pass on the other Side the Pole. Next mark the Points on either Side the Polar Point P, with the Degrees of Latitude, viz. 80, 70, 60, &c. on one Side, and with the same on the other. Lastly, describe Circles thro' the corresponding Points, or those mark'd with Figures of the same Denomination for the Parallels of Latitude ; first put one Foot of the Compasses in the Pole, and sweep
a Circle

a Circle thro' the Points of 80, for that Parallel of Latitude : Then strike a Circle thro' the two Points at 70, for the 70th Parallel ; and so on, dividing the Space between the corresponding Degrees, to find the Center, each Parallel having a different one.

[If any should think this Way of finding the opposite Points not exact enough, he may follow the Way lay'd down in the first Method of this Projection ; that is, having divided one of the Quadrants, as W N, into 90 Degrees, set off the Distance of 10 Degrees from A towards W, as often as there will be Occasion ; and the Intersections of the Lines (drawn from W to those Points in the Horizon) in the Diameter S N extended, will be the opposite Points (through which the Parallels are to pass) requir'd.]

Note, That the Points in the Diameter N S, will be of the same Denomination with those (by which they are made, *viz.*) in the Arch of the Meridian W P D : Thus the Parallel

let 80 in P E D, will cut the Parallel 80 in P S the Diameter; 70 will cut 70, &c. 50 in P E D, will cut 50 in P S; as $51^{\circ} 30'$ in the Quadrant P E D, cuts the Latitude of *London* in the Meridian P S; 80, 70, 60, &c. in the Quadrant P C, will cross the Parallels 80, 70, 60, &c. in the Meridian P N. And lastly, the Point of the Meridian cutting the Equator in D, will intersect the Horizon in B, and the first Meridian P S in Q, which is the Point there, thro' which the Ambit of the Equator in the Horizontal Construction must be projected.

§ 6. When you have done so far, describe a Circle round the Horizon pretty close, to contain the Degrees of Graduation. This Graduation must be made between the Meridians, and not the Parallels, each into 10 Parts, or Degrees, to shew the Longitude of Places. The Latitude must be graduated on the first Meridian N S, and number'd from the Equator towards either Pole, and from the Pole backward towards N; This done, strike a Circle without that again, wide enough to hold the Figures belonging to the number'd

number'd Degrees. Lastly, describe two more Circles, the first near the former, and divide the Quadrants into eight Parts each, that is, into 32, the whole Circle, to shew the bearing of all Places in the Hemisphere, in respect of *London* the Center. All the foregoing Circles of the Graduation are seen in the lower Figure, in which so much of the Earth is describ'd, as is contain'd within the Horizon of *London*, as a Specimen of the Nature and Use of this Projection. The outward graduated Circles supply the Place of the *Azimuths*, and save the Trouble of drawing them, and the Confusion they might occasion, if they were drawn; for a central Rule, (which must be fix'd in the Point of the Center, or in the Place of *London*, and graduated with the same Parts into which Z N is divided) being mov'd about to any Place, we may presently tell the Distance thereof, by Help of the Ruler; and the bearing or Point of the Compass, on which it lies, from *London*, may as easily be known by the Section of the outward or *Azimuth* Circles, whereon the Points of the Compass are to be represented:

Thus

Thus your Projection being compleatly finish'd, it is an easy Matter to insert the Places according to their Latitudes and Longitudes, as hath been frequently repeated.

§ 7. Lastly, if you would know of what Bigness your Meridian Projection must be, to project from it a Horizontal Projection of any given Dimensions, you must seek the Diameter of the Meridian Projection by this Rule of Proportion, as *Cosine Latitude* is to *Radius*, so is the given *Semidiameter* of the Horizontal Projection to the *Semidiameter* of the Meridian Projection.

§ 8. The *Semidiameter* of the Meridian Projection being given, to know the *Semidiameter* of the Horizontal Projection, say, as *Radius* to *Cosine Latitude*, so is the *Semidiameter* of the Meridian to the *Semidiameter* of the Horizontal Projection.

§ 9. Having the *Semidiameters* of both Projections given to find the Latitude, say, as the *Semidiameter* of the Meridional Projection is to the
Semi-

Semidiameter of the Horizontal Projection, so is *Radius* to *Cosine* Latitude.

N. B. The Versed Sine of the Co Latitude in the Meridional Projection, is equal to the half Tangent of the Comp. Latitude in the Horizontal Projection.

§ 10. A much greater Part of the Surface of the Earth may be represented in this Projection, than any other; that is, supposing *London*, or some Town in the neighbouring Countries, to be the Center; for *Europe*, *Africa*, and *Asia*, excepting a Part of *China*, are entirely exhibited; all North *America*, and the best Half of South *America*. Also, by extending the Projection beyond the Horizontal Circle, you may introduce the Places that are wanting; but this is not so convenient, by reason the Parts near the Horizon are too much dilated in one Hemisphere, and consequently would be more so, the farther the Projection extended. The Course and Distance of all Places from the Center, or Point of bearing, are found therein without much Trouble.

§ 11. At

§ II. At the same Time you are about one Horizontal Projection, you may be carrying on two from a Meridional Projection; that is, one for the Northern, the other for the Southern Hemisphere; provided the Latitude of the Place in the Center, does not exceed $55^{\circ} 00'$, because then the Horizons would touch one another, that is, the Horizons of the Horizontal Projections would touch the Equator in the Meridional Projection, and consequently meet there.





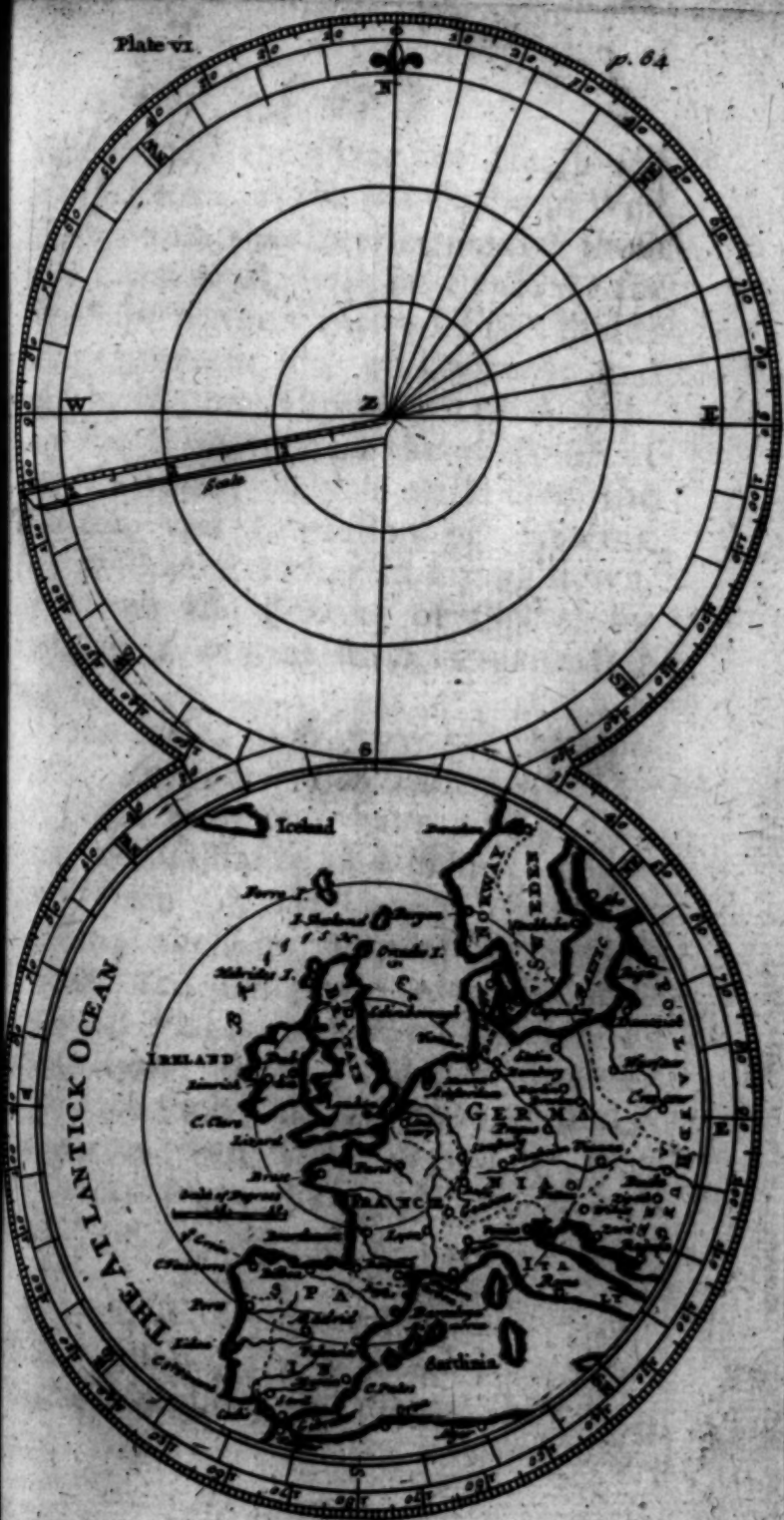
C H A P. IX.

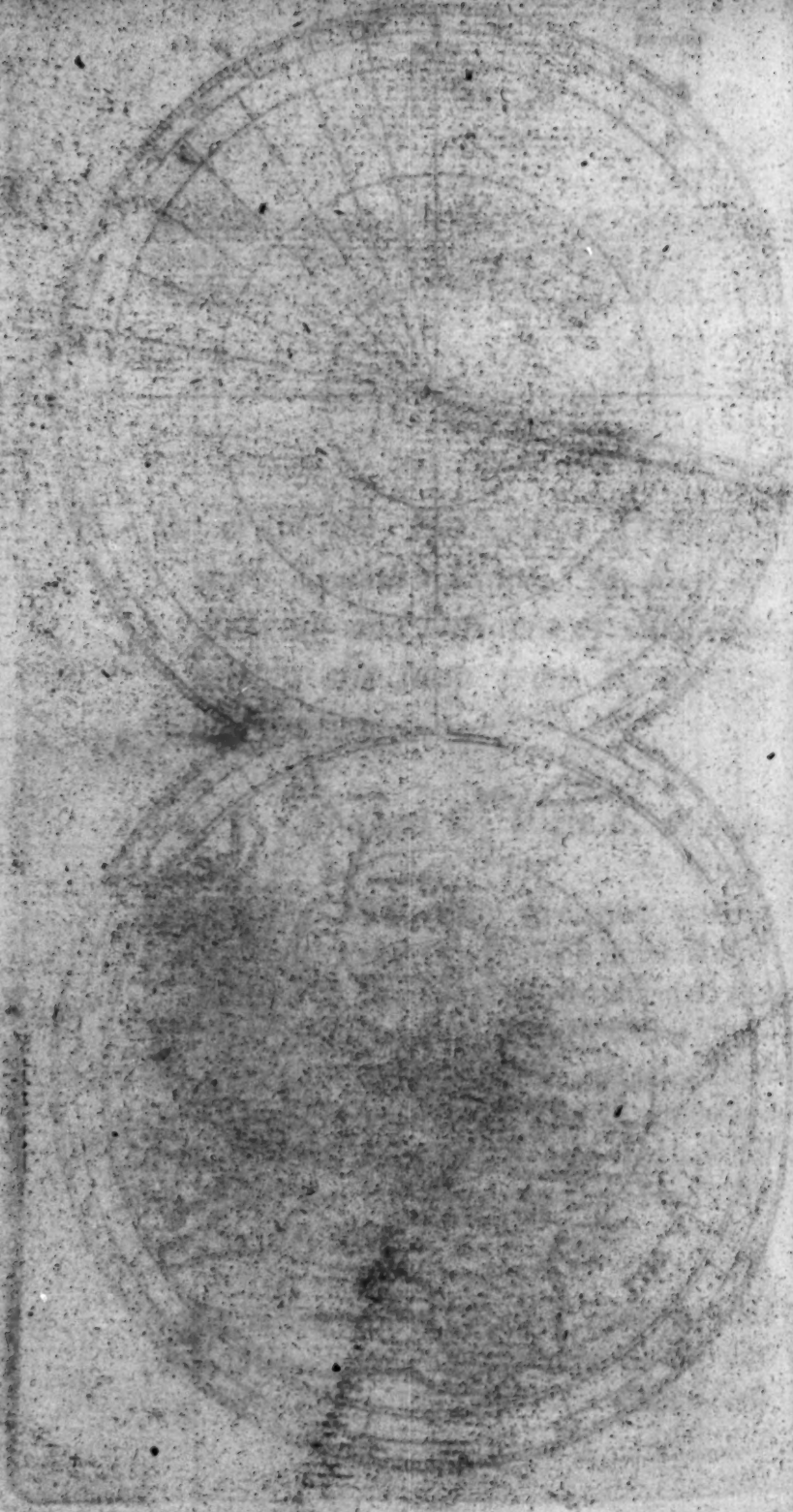
*To draw the Horizontal Projection,
with Azimuth Lines, to shew the
Bearing and Distance of all Places
within the Map from London in
the Center.*

Method 6. Plate 6.

THOSE that are not willing to take the Trouble of drawing the former Projection, and are content to know the Bearing and Distance only of Places from the Center, without the Longitude or Latitude, may use the following Method for describing the Horizontal Projection.

§ 1. Describe a Circle; cross it with two Diameters. N S represents the Meridian





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Meridian of the Place, or North and South Line; W. E. the East and West Line; and the Intersection of those two Lines at Z, will be the Place for the Point in the Center. Then divide each Quadrant into 90 Degrees; and within another Circle describ'd without the former, mark the 32 Points of the Compass, which will save the Trouble and Confusion of drawing Bearing-Lines, either in laying down, or finding the Bearing of Places, by Help of a central Rule, as hereafter taught.

This done, you may put *London*, *Paris*, *Amsterdam*, *Constantinople*, or any Place that you have a Mind to know the Distance and Bearing of others from, in the Center. Suppose *London*; then by Help of Tables of Bearing and Distance, you may lay down all Places in Respect thereof to Satisfaction; or to avoid the Trouble of making such Tables, you may transfer Places into your Projection immediately from the Globe or Maps, thus.

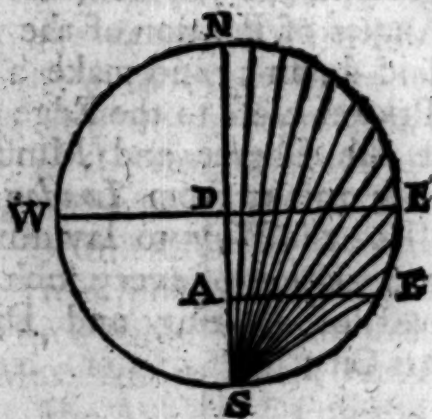
§ 2. 1st, To lay down Places by Help of the Globe, bring *London* to the Brazen Meridian, and elevate the Pole
F according

according to its Latitude $51^{\circ} 30'$. Let the Quadrant be fix'd in the Zenith, and apply'd to every Place whose Situation you would represent, (for Instance, to the Coasts, Bounds, and Cities of *France, Spain, Sweden, Germany, Turkey*, and all other Countries within the Hemisphere) and note the Angles which the Quadrant makes with the Meridian in each Application; that is, the Angles of Position of the Place from *London*. At the same Time observe how many Degrees of the Quadrant lie between *London* and the Place, and that will be the Distance. At each Application of the Quadrant, you may find the Distance of many Places, by marking at what Degree the Edge of it passes over them; and then they have all the same Angle of Position.

§ 3. For transferring the Bearing and Distances of Places so taken, into your Map; if the Representation don't exceed two or three Kingdoms, you must have a Scale of equal Parts, that may extend from the Center to the Horizon. Then fixing one End of it in the Point of *London*, that it may move about like a central Rule, move it to the

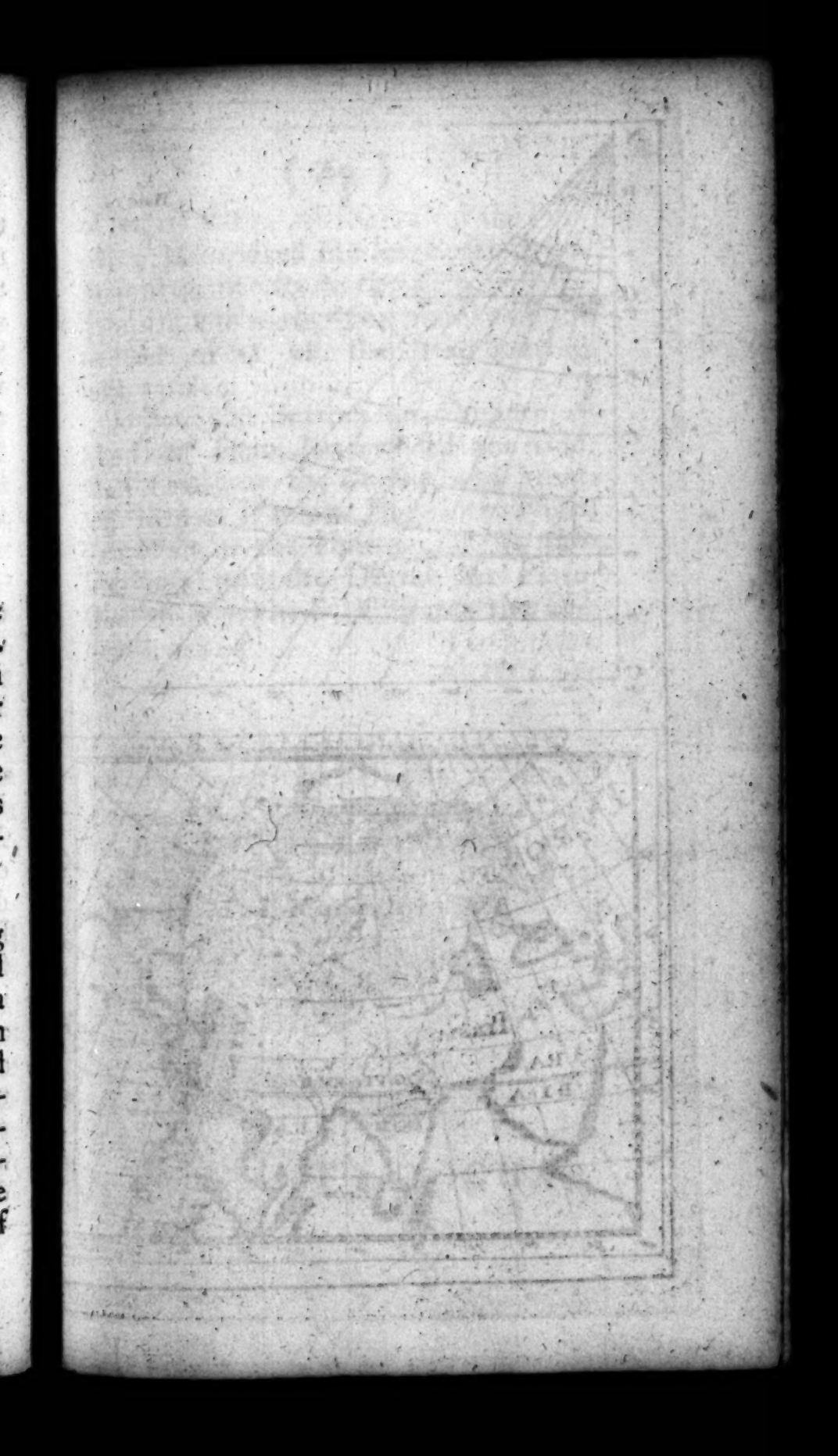
the Degrees in the Horizon, according to the Angles of Position of the Places to be laid down; and make a Point with a Pricker close to the Edge of the Scale at the Degree and Minute by which it is distant from *London*; and that will be the Way to lay down or find the Situation of every such Place, in Respect of Bearing and Distance from that City.

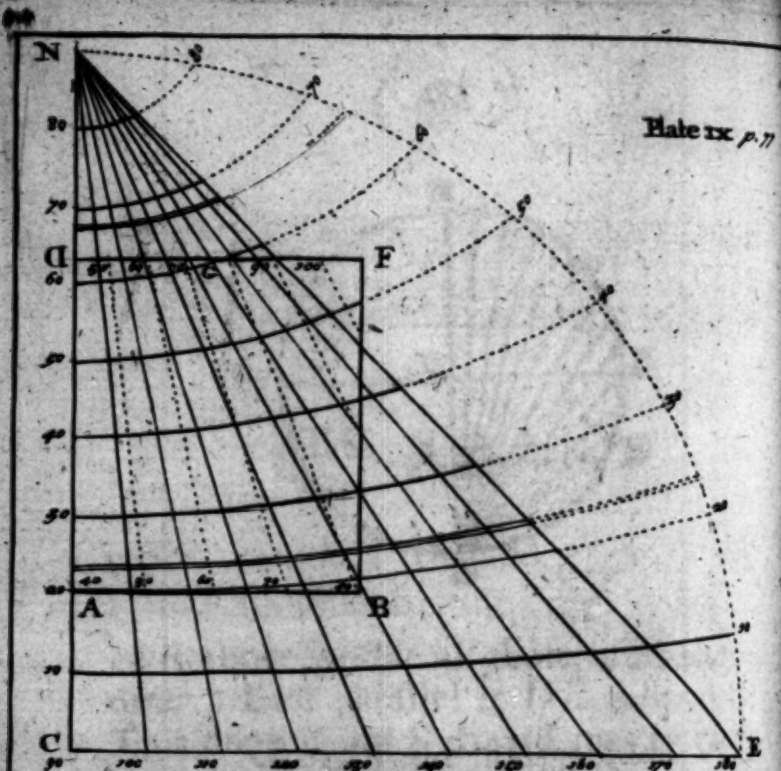
§ 4. But if the Places to be exhibited, extend to or beyond an Hemisphere, the Scale must be divided after another Manner, *viz.* according to the Rules of Perspective. The Eye is suppos'd to be posited in the Antipodes, or the Point diametrically opposite to *London*, and the Horizon to be the *Medium*, provided the Projection don't exceed an Hemisphere; but in Case it does, then we must conceive a plane Parallel to the Horizon, as far distant from it as the Place to be represented is above an Hemisphere; therefore in another Paper draw the Circle W N E S, and having cross'd it with two Diameters, divide the Quadrant N E into 90 Degrees, and transfer from it as many Degrees below E into the Quadrant E S, as the Part to be represent-



ed is above an Hemisphere, and there draw a Line parallel to DE, viz. AB. This done, from S draw Lines to each Degree of the Quadrant NE, or NEB, (if more than an Hemisphere be exhibited) which may divide the Lines DE and AB into such Parts as the Scale or central Ruler must be divided.

§ 5. In like Manner may the Bearing and Distance of Places be transferr'd from another Map, especially from a *Mercator's*, if the Projection includes an Hemisphere, or extends beyond it; and then such a Scale as I have last describ'd, must be made to it: But if only a Kingdom or two be to be exhibited, any common Map, and the Scale
of





of equal Parts, will serve for the Purpose ; and indeed the less Space is represented, the truer the Map will be. The Specimen therefore extends only to some Part of the neighbouring Countries.

To find the Bearing and Distance of any Place from *London*, fix one End of the Scale in the Center, and bring the Edge of it to the Place ; the Point it touches in the Horizon, shews the Bearing ; and the Degree the Place touches at in the Scale, shews the Distance,





C H A P. X.

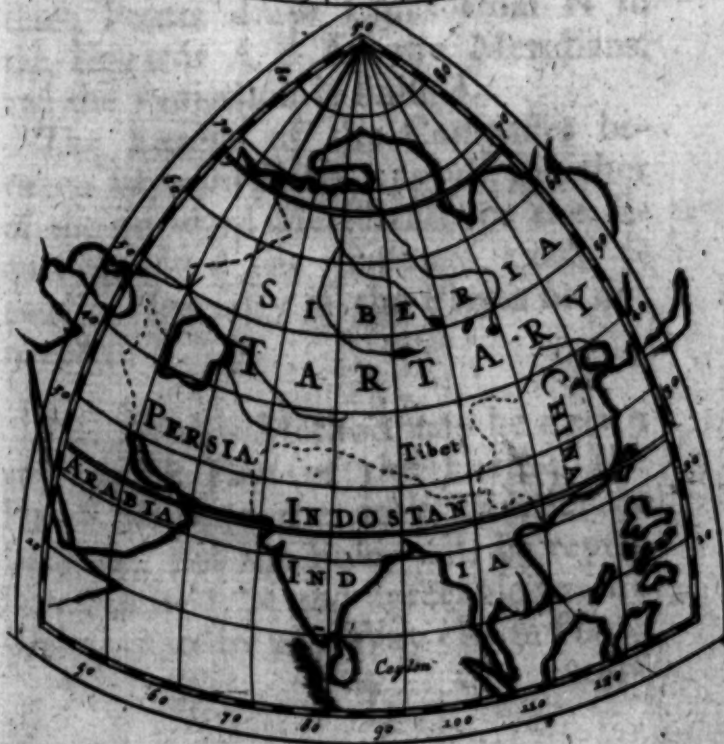
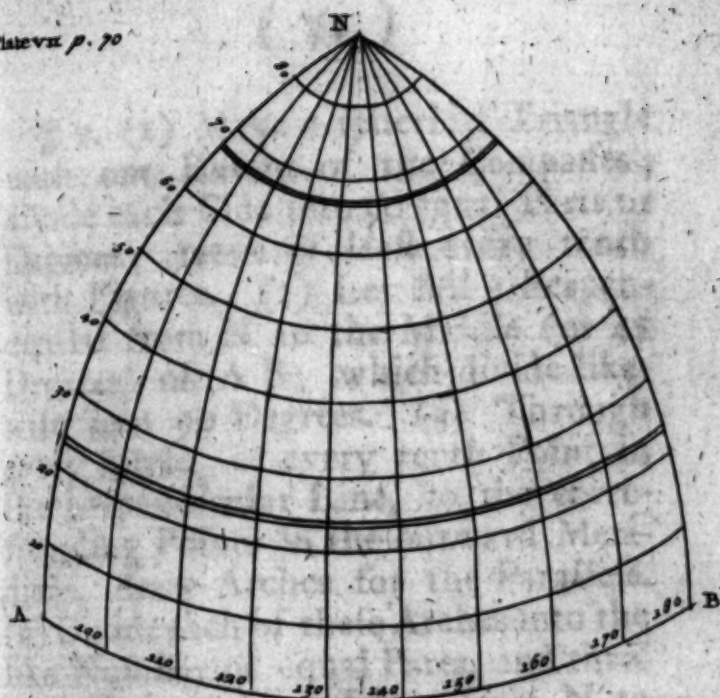
*The Projection of an eighth Part of
the Globe.*

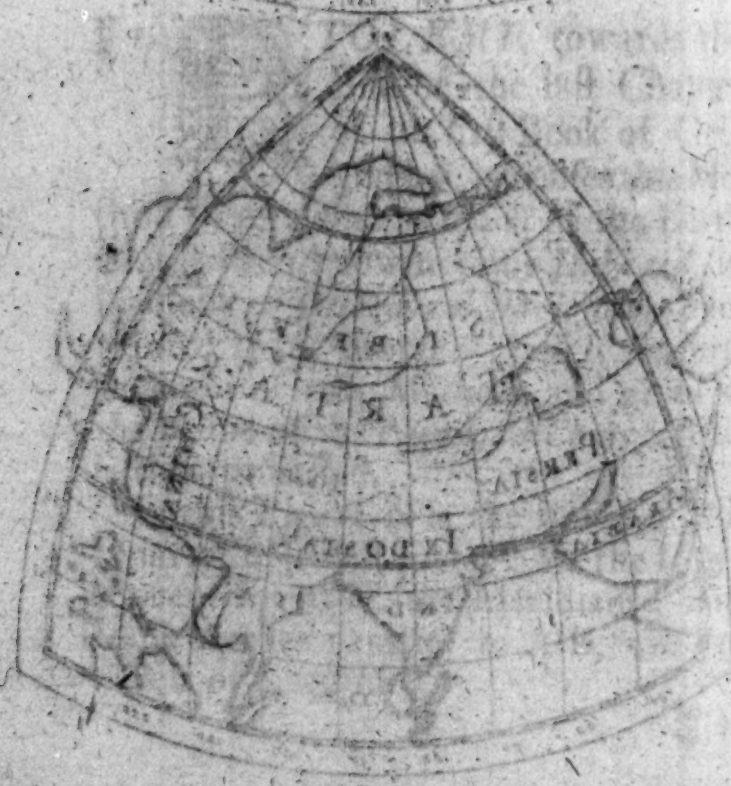
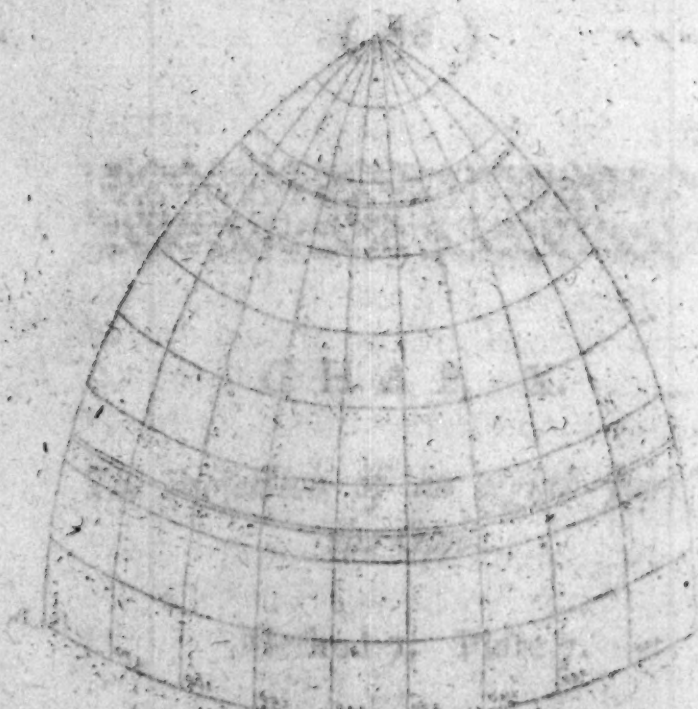
Method 7. Plate 7.

§ 1. **P**TOLEMY, towards the End of the last Chapter of his first Book of Geography, proposes this Method to represent as much of the Earth as was then known. But *Hubbard*, in his Book of *Orthodoxal Navigation*, 8vo, printed 1656, supposes himself the first Inventor of this Method, and gives it the Name of the *Paradoxal Chart*, which is thus projected.

In this Figure N is the Pole, A B a Quarter of the Equator; all the Lines concentring at N, are Meridians; and those Arches parallel to A B, are Parallels of Latitude.

§ 2.





§ 2. (1) Make a spherical Triangle with one Extent of the Compasses; divide each Side into 90 equal Parts or Degrees; mark at least every tenth with Figures. (2) Let fall a Perpendicular from N to the Middle (or 45 Degrees) of A B; which divide likewise into 90 Degrees. (3) Through every single, or every tenth Point in the perpendicular Line, to the corresponding Points in the outward Meridians, draw Arches for the Parallels. (4) Divide each of these Arches into the like Number of equal Parts, and thro' those Points draw Lines from N to the Equator A B for the Meridians, and the Projection is finish'd.

The Extent of the Compasses between any two Places, apply'd to either of the outward Meridians, or the Equator, gives the Distance exact enough, especially if the Places be not remote.

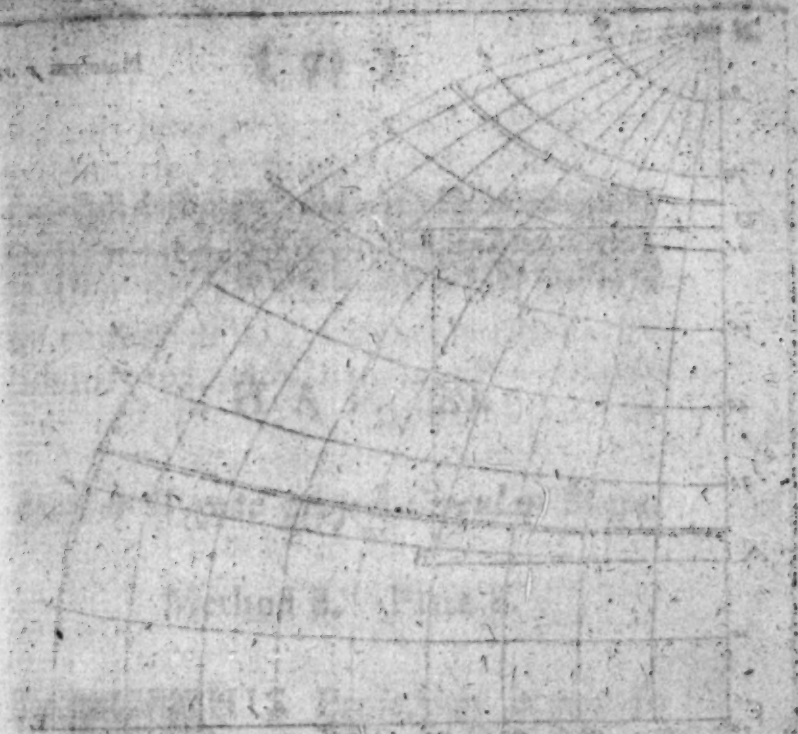
§ 3. By this Method may be drawn any eighth Part of the Earth; the Places between the 30th Parallel of Latitude, and the Pole, will be represented more true and agreeable to the Globe, than by any Way else in *Plano*,

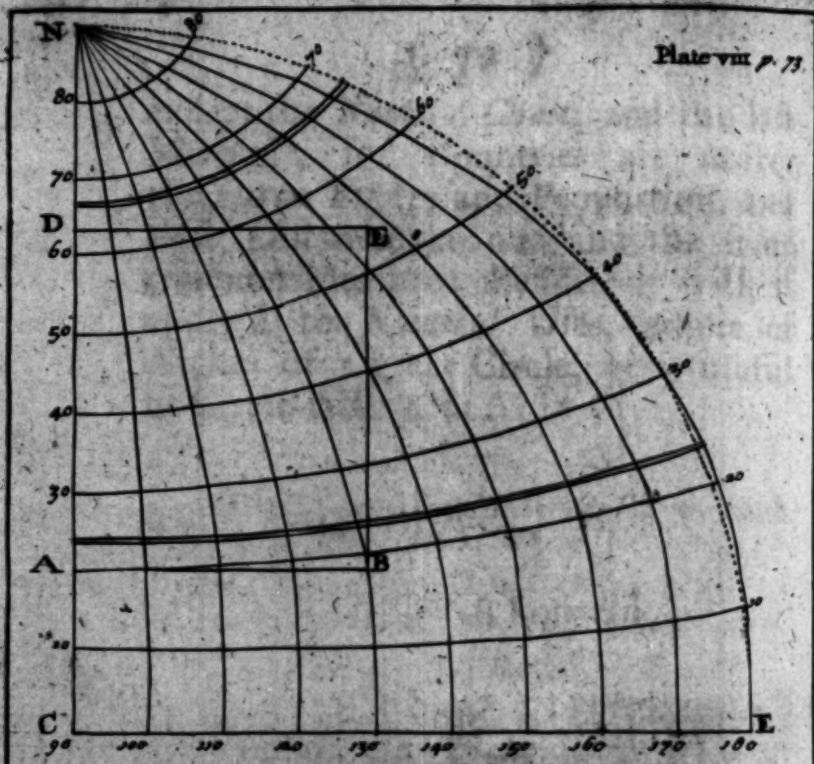
except the *Nautical Chart*, and the last Method ; for Countries are nearer their true Figure and Proportion, and their Distances to one and the same common Measure: Besides, it will, if apply'd to *Nautical Uses*, admit of Arches of a great Circle, very useful in Circle-sailing.



W. A. 1771

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C H A P. XI.

Another Way to project Circular Maps.

Method 8. Plate 8.

§ 1. **T**HIS Projection is not so agreeable to Opticks, as the Meridional; but the Figure and Dimensions of Countries are much truer express'd by it.

To make the Figure more large and intelligible, we have projected but a Quadrant of an Hemisphere; and indeed more would be needless; for knowing how to do one, is knowing all; and one Quarter of the Hemisphere being delineated, to add more is only to do the same Thing over again. In this Figure the East and West Line represents the Equator, the North and South Line that Meridian 90 Degrees distant from the first.

§ 2.

§ 2. The Manner of the Projection is thus: Upon C, as a Center, strike a Circle; cross it with two Diameters, and divide each Quarter into 90 Degrees. Number the Latitude on the Meridian from the Equator toward either Pole; and the Longitude on the Equator from the outward (which is generally the first) Meridian, 180 Degrees East of it, if it be the Eastern, and 180 Degrees West of it, if the Western Hemisphere. Thus C N E will represent a Quadrant of the Eastern Hemisphere, C E will be the Equator, C N the Meridian 90 Degrees East of the first, and N E that Meridian distant from the same 180 Degrees.

Having three Points given for each Degree, or each tenth Degree of Latitude, viz. one in the prime Meridian, another in the Meridian N C, and a third in the Meridian N E; find their Centers, and project Circles thro' them for the Parallels of Latitude; which are thus drawn.

§ 3. Then the Meridians are drawn by Help of the Table for decreasing Longitude, inserted Part II. Chap. III. and may be thus effected: If Parallels

are

are drawn thro' each Degree of Latitude, divide a Degree of the Equator into 60 Parts; and taking from thence so many Parts as a Degree of Longitude contains in each Degree of Latitude, set off the respective Distance 90 times upon each Parallel on both Sides of the North and South Meridian N C; and laying a Ruler to the responding Points in each Parallel, draw Lines between; which Lines, this Way join'd together, will form curv'd or arch'd Meridians.

§ 4. If you would describe Meridians thro' each fifth or tenth Degree of every fifth or tenth Parallel, as in the Figure, take the Extent of ten Degrees of the Equator, and divide it, as if it was but one Degree, into 60 Parts; from which take the Parts proportionable to a Degree in the Table for each tenth Degree of Latitude, and apply the same nine times Eastward and Westward of the North and South Meridian, on the Parallels as aforesaid; and Lines drawn from Point to Point, will form circular Meridians to every tenth Degree of Longitude.

§ 5. If you would draw a Map after this Method, of any Size, supposing to contain 40 Degrees of Latitude, and 80° of Longitude, as in the Figure D F A B, 'tis only making the Projection, and cutting so much out. Observe, that it is after this Method, that Globical Papers are projected, *Vid.* Part II. Chap. III. and so much of the Map of *Asia* as lies between the Equator and the 70th Parallel, and the 80th and 100th Meridian, will serve for half a Globical Paper, of which 18 will cover a Globe.

§ 6. The Distances may be found by taking the Extent between two Places in the Compasses, and applying it to the Scale; but if you would be more nice, make use of the Method laid down in the Meridional Projection.

C H A P.

C H A P. XII.

*To draw a Map of a mix'd Kind,
whose Meridians are strait Lines,
and Parallels Arches of Circles.*

Method 9. . Plate 9.

§ 1. **H**AVING finish'd the circular Projections, I come now to those of a mix'd Kind; which are either such which have circular Parallels and strait Meridians, or circular Meridians and strait Parallels. Both these Projections borrow from the former, and so far as to drawing the Parallels, this goes along with it; which having perform'd, by the same Method, the Meridians must be drawn after another Manner, very easy in the Practice.

For

For it is only to lay a Ruler upon the Pole N, and draw strait Lines to each Point of Division in the Equator C E, and the Meridians are describ'd.

§ 2. But because, as may be seen by the Figure, Places will be strangely distorted and contracted, by reducing the circular Meridians into strait Lines, therefore it is neither usual nor convenient to represent an Hemisphere after this Method: But it is often us'd in exhibiting one of the Quarters, and particular Kingdoms.

§ 3. If then you would project a particular Kingdom, draw your Projection proportionably large to the Dimensions of the Part to be taken from it; but describe only the Parallels. Then at the Latitude where your Map begins, suppose at 20 Degrees, parallel to the Equator C E, draw a strait Line for the South Bounds A B. Next let the Map contain in Longitude, for Instance, 80 Degrees; and by the Table for decreasing Longitude, Part II. Chap. III. set off from A, on either Side the Meridian N C, 40 Degrees in the 20th Parallel, as A B. This done, by the said Table set off in like Manner on either

either Hand of the Perpendicular, or middle Meridian N C, 40 Degrees in the 60th Parallel, which we'll suppose to be the greatest Latitude of the Map, and thro' the Point C draw a Line parallel to A B; and laying the Distance A B from D to F, draw the Line F B.

§ 4. Thus D F B A is one half of the Projection; D A is the Perpendicular, or middle Meridian, and B G that Meridian 40 Degrees distant from it, and 80 Degrees from the Meridian (40 Degrees distant from the Perpendicular) in the other half, which is not here express'd, for want of Room. Lastly, allowing some Space for the Scale, and noting the Degrees of Longitude and Latitude, cut out that Part from the rest of the Projection, and then describe Places upon it.

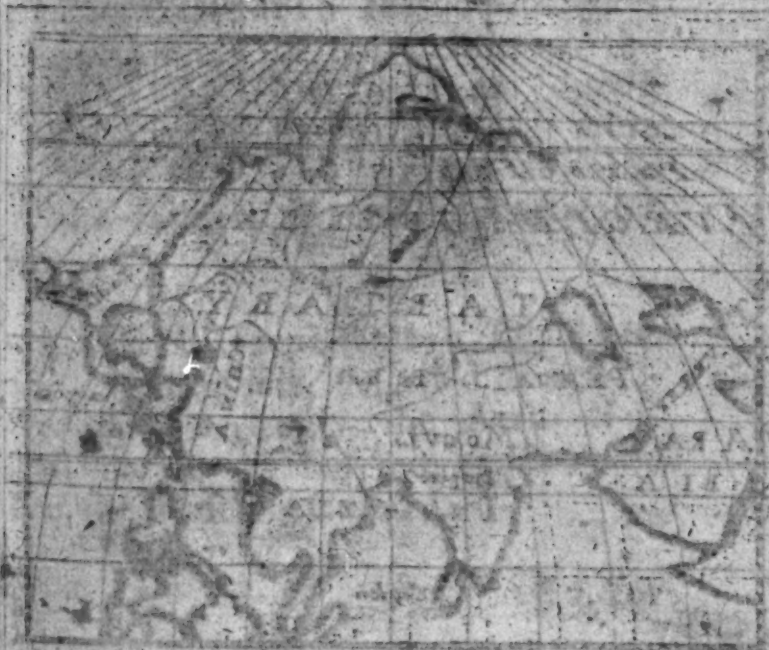
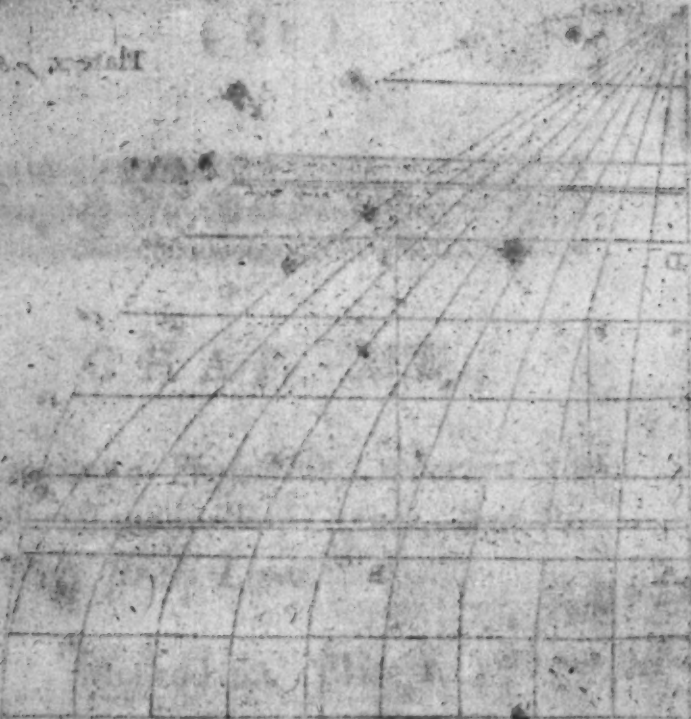
§ 5. Here you see the Difference or Disproportion between the same Part in a particular, and in a general Map; 40° in the Parallel 60 of the particular Map, contain almost 70 Degrees of the same Parallel in the general Projection. In the 20th Parallel, 40 Degrees of the one, contains 50° of the other;

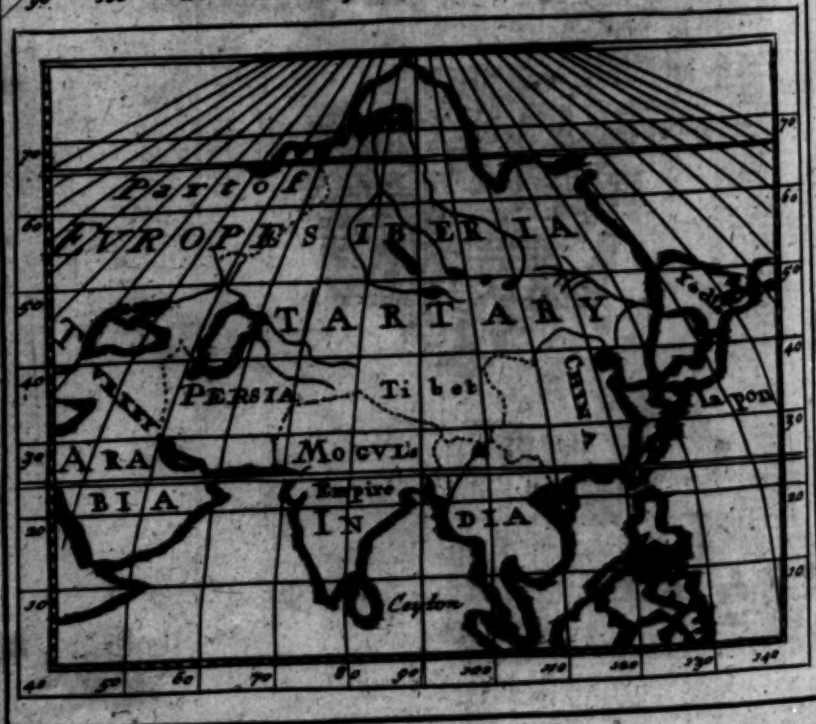
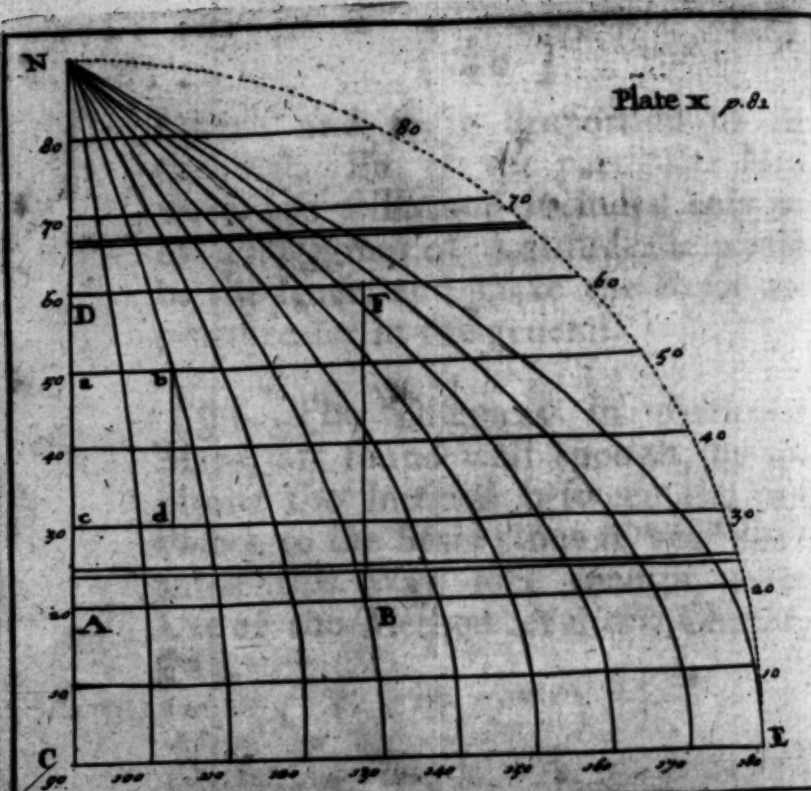
other; and so in Proportion of all the rest. But if the particular Map were less still, and included only 10 or 20 Degrees of Latitude, it would be the truer, and make the Error appear greater in the general.

§ 6. The Distances in particular Maps, are found well enough, by applying the Interval between the two Places to the Scale; but if you don't think this Way nice enough, make Use of the Method set down Chap. 6, § 13.



Table 1







C H A P. XIII.

To make a Projection, wherein the Meridians will be Curves, and Parallels strait Lines.

Method 10. Plate 10.

§ 1.  HIS Method partakes of the eighth, as the Meridians are drawn like it; and is more easy, if not so true as the former, in making particular Maps.

§ 2. G N E represents a Quadrant of an Hemisphere, describ'd as in Method 8, § 2; only the Arch N E must not be divided into equal Parts, like the Lines N C and C E.

G

§ 3. For

§ 3. For the Parallels draw strait Lines thro' every Degree, or every 10th Degree, in the Meridian N C, Parallel to the Equator C E.

§ 4. The Meridians are describ'd by Help of the Table for decreasing Longitude, as is already taught in Method 8, § 3.

§ 5. This Method is so much the more easy, because there is no Necessity for projecting an Hemisphere for every Map you would make. Suppose you would draw a Map of some Parts between 20 and 60 Degrees of North Latitude, containing 80 Degrees of Longitude; first draw the Line A B at the Bottom of your Paper, raise a Perpendicular in the Middle, and divide it into 40 Degrees. Then, because a Degree in the Perpendicular (that is, a Degree of Latitude) is equal to a Degree of the Equator, divide one of them into 60 Parts, or Minutes, and, according to the Table for decreasing Longitude, in the Latitude of 20°, on each Side of the Perpendicular A D, set off 40 Degrees on the Line A B; and at each End raise other Perpendiculars, and divide them

them likewise into 40 Degrees ; then draw Parallels thro' the responding Points in the Perpendiculars.

§ 6. This done by Help of the said Table, set off the Quantity of a Degree in each Parallel, on either Side the Meridian A D, so many Times, 'till you come to the Sides, and draw Lines from Point to Point, to form the Meridians ; then, on the Parallels A B, and D F, number the Degrees of Longitude, and the Degrees of Latitude, on the Side Perpendiculars. But if the Map contain yet fewer Degrees of Latitude and Longitude, as the Specimen *a b c d* exhibits, it would be still more exact, as indeed all Maps are, in Proportion to the Smallness of the Part represented.

The Distances are found, as observ'd in Method 8, or 9, § 6.

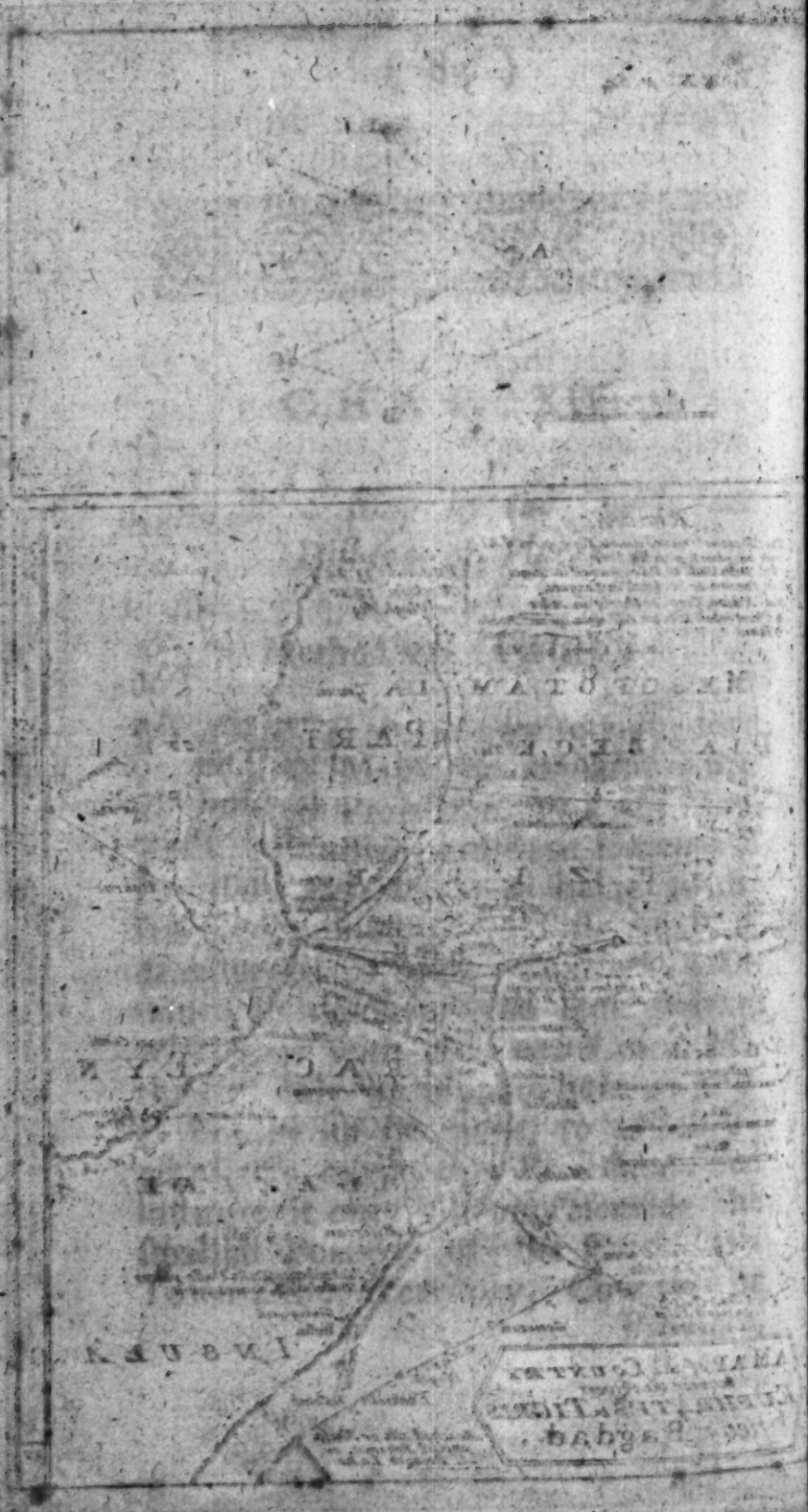


C H A P. XIV.

To draw a Map by the Course and Distance of Places.

Method II. Plate II.

§ 1. **W**E come now to right-lin'd Maps; having skipp'd that Projection, whose Meridians are strait Lines, and Parallels *Hyperbola's*, as being as useless as troublesome. This Way of drawing Maps by the Course and Distance, is much of the same Nature with that with *Azimouth Lines*, Method 7, only we suppose here an actual Survey to be made, to which we peculiarly adapt this Projection, and institute it only for representing the **smallest Portions of the Earth**, as a Town-Land, Territory, County, or Province,



Province, but never to extend to a Kingdom. The following Directions will serve both for the Manner of making the Survey, and laying it down on the Map.

§ 2. Let there be (suppose) six Places of any Region to be dispos'd in a Map, according to Course and Distance represented by A, B, C, D, E, F: Chuse one of them for your first Station, as A, from whence all the rest may be conveniently beheld, where placing an Instrument, (as a Semicircle) observe the Angles of Position of each Place, namely, the Angles between the Meridian Line of the Place of Observation, and between the Course of the other Places B, C, D, E, F; and having found the Distance between A and some one of the rest, suppose B, set down your Observations so far in your Field-Book, This done, chuse a second Station, for Example, B, and observe the same Way as before, the Angle of Position of the Places C, D, E, F, and mark the same in your Field-Book: This Time you need not measure the Distance between your Station B, and

some other Place, nor make any more Observations, these being sufficient to determine the Situation of the rest.

§. 3. Then prick down A in your Paper, and by a Protractor, set off the Angle of Position between it and B, which you find in your Field-Book to be 45 Degrees between the South and the East, and draw a Line from A, long enough to contain the Distance to B, which you find in your Table to be 8 Perch: After the same Manner draw the bearing Lines of the Places C, D, E, F. This done, removing the Protractor to B, set off from thence the Angles of Position of the Places C, D, E, F; and where those Lines intersect, the Lines of Bearing from A, will be the Points of their Situation.

§ 4. The bearing of Places is found the same Way they are lay'd down; settle the Center of the Protractor in A, and fixing it in a due Position with the Meridian of the Place, lay a Thread from thence to D, and see where it cuts the Edge of the Protractor,

tractor, which shews on what Point of the Compass it bears from A, viz. E N E, at the same Time may the bearing of all other Places from A be found. Then on the Scale of Perches, measure the Extent between A and D, and that gives you the Distance, viz. 12 Perch.

This Method, or one like it, was follow'd by Sir *George Wheeler*, in making his Map of *Greece*.



C H A P. XV.

*To draw a Map in Plano, commonly
call'd the plain Chart.*

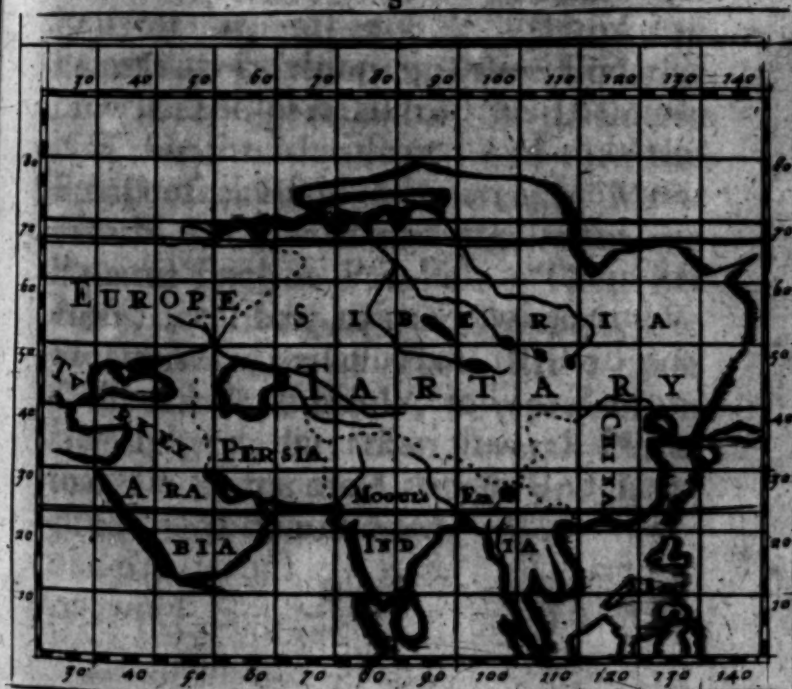
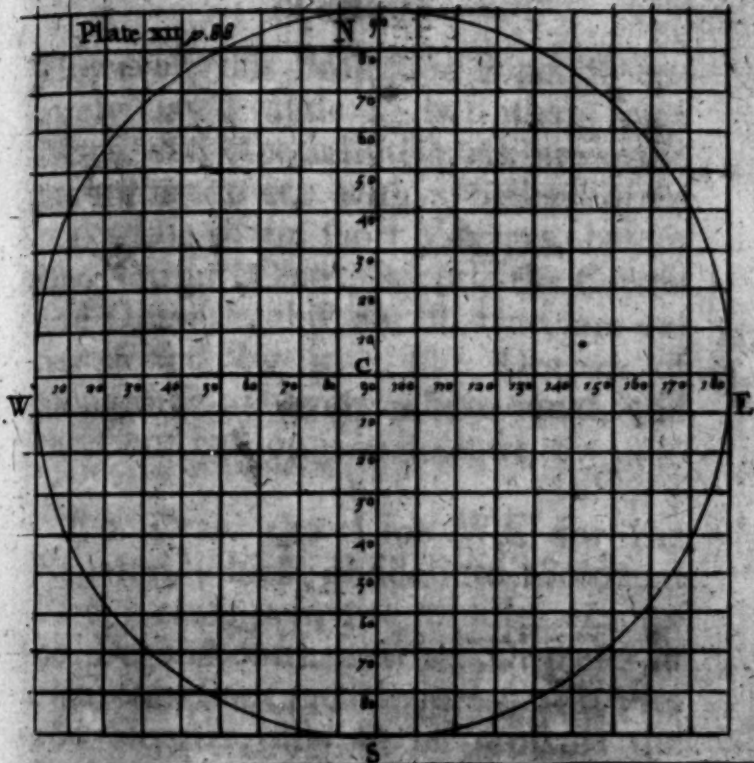
Method 12. Plate 12.

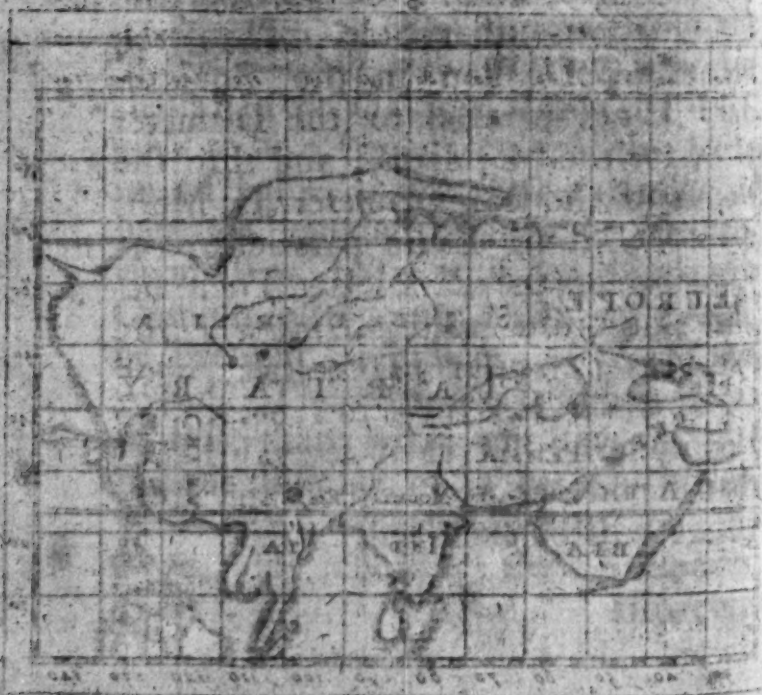
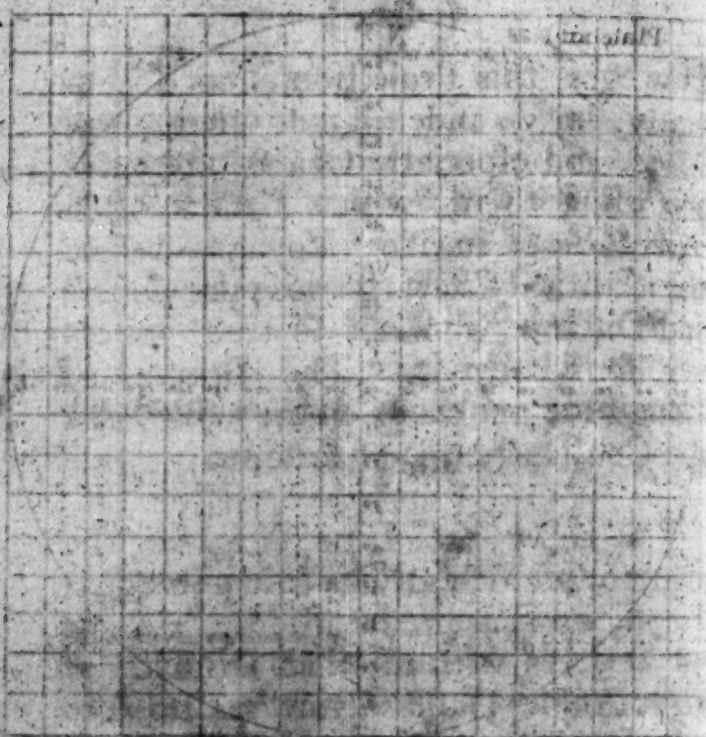
§ 1.



S this Method is of all others most easy, so is it most erroneous, having sprung from the false Notion the Antients had of the Earth, which they imagin'd to be a large circular Plain, like a round Table, whose *Basis* extended *ad infinitum*, passing through the Heavens themselves. Nor is it long since this Opinion lost Footing, and People could be brought to believe the World was round. There needs no other Proof of this, than what we have in that famous Instance of a certain Bishop, who was excommunicated by the Pope, for asserting the Antipodes. However,

Plate XII p. 88





However, this Projection is not so entirely lay'd aside ; but that some Maps, and especially Charts, are made according to it, which Sailors often make Use of in short Voyages, before the Nautical Chart, because the Course and Distance, tho' not so true, are easier found by it. The Degrees of Longitude are every where equal, and the Construction is as follows.

§ 2. Draw the Line WE for the Equator, which divide into 180 equal Parts ; cross it in the Middle, viz. at 90 Degrees with another Diameter at right Angles ; and divide it also into 180 Degrees, setting off 90 from the Equator on either Side. Thro' the Points of Division in the Equator, draw Lines parallel to the Diameter N S, for the Meridians ; and thro' the Points of the said Diameter, or Meridian N S, draw Lines parallel to the Equator for the Parallels. Then because, according to this *Hypothesis*, the World is a circular Plain, strike upon C the Circle N E S W, to represent an Hemisphere ; but then several Places that lie in remote Latitude and Longitude will be excluded,

§ 3. This

§ 3. This Way will be easier perform'd, if you divide a Square into Checquers or Squares, and add as many Degrees of Latitude and Longitude, as are requisite over and above. Any Part within 20 Degrees on either Side the Equator, may be exhibited by this Method, agreeing with *Mercator's* well enough; but if it extend beyond that, there is no Truth to be expected from it.

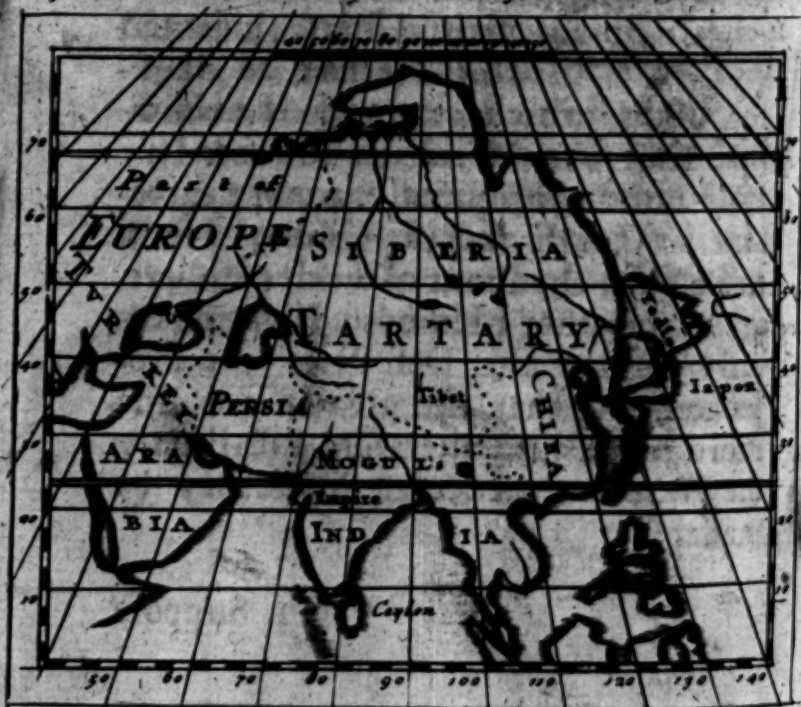
§ 4. Particular Maps are drawn after the same Manner as the general, by making the Degrees of Longitude and Latitude in all Sides equal; therefore there is no expecting to find the Bearing and Distance within a great Way of Truth, except the Part lie within 20 Degrees of the Equator.

I was oblig'd to contract the Scale of this Map, to bring *Asia* within Compass; by which Figure (compar'd with the rest) the Erroneousness of this Projection will more plainly appear.

CHAP.

This image shows a blank, aged, cream-colored page, likely an endpaper or flyleaf of a book. The paper has a slightly textured appearance with some minor discoloration and faint horizontal lines near the bottom edge. The binding edge on the left is visible, showing the stitching or glue of the book's spine. There is no text or other markings on the page.

[Faint, illegible handwriting across the page]





C H A P. XVI.

*To draw the Projection commonly us'd
by Geographers in particular Maps.*

Method 13. Plate 13.

§ 1.



PTOLEMY, to remedy,
in some Measure, the
Inconveniencies of the
plain Chart, invented
this Method of draw-
ing Maps, which expresses the Inclination of the Meridians towards the Poles, and consequently is more agreeable to Truth and the Globe. I have describ'd a Quadrant of an Hemisphere, as in the other Methods; but it serves only to shew the Defects of the Projection, and that, the greater it is, the more erroneous; therefore I shall only shew how a particular Map may be made.

§ 2. Suppose

§ 2. Suppose you would draw a Map of some Part of the Earth, containing 30 Degrees of Latitude, and 80° of Longitude; draw a strait Line at the Bottom of your Paper, and in the Middle raise a Perpendicular, on which set off 30 Degrees of Latitude from A to D, and draw a Line parallel to the bottom Line: Then from a Degree of Latitude, divided into 60 equal Parts, (by Help of the Table for decreasing Longitude, Part 2, Chap. 3) take the Content of a Degree in the 30th Parallel, and set off 80 Degrees thereon, that is, 40 Degrees from A to B on one Side the Perpendicular A D, and 40 Degrees on the other Side, (which, for want of Room, is not express'd in the Figure) and raise Perpendiculars, which may touch the upper Line, as B F; and set off the Degrees of Latitude, drawing Parallels at every single, 5th, or 10th Degree. This done, by Help of the same Table and Scale, set off the Content of a Degree in the 60th Parallel from D, first towards F, and then on the other Side (here omitted) as far as you can go, and draw Lines from the Points in the upper Parallel to the answerable Points in the bottom Line, for the

the Meridians ; then number the Degrees of Longitude in the top and bottom Scales, and the Degrees of Latitude in the side Scales, and the Projection is ready for drawing your Map.

§ 3. As in the other Projections, the larger the Place to be describ'd is, the more erroneous, and the smaller, the truer the Map will be ; so that a Map containing but 10 Degrees of Longitude and Latitude, must be more exact than that of 30 Degrees ; and one of two or three Degrees, exacter than either.

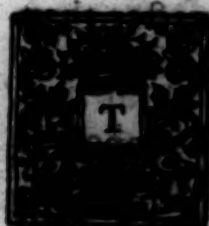
§ 4. The Course and Distance is found the same Way as in Method 11, § 4, and if the Place be small, will be exact enough.



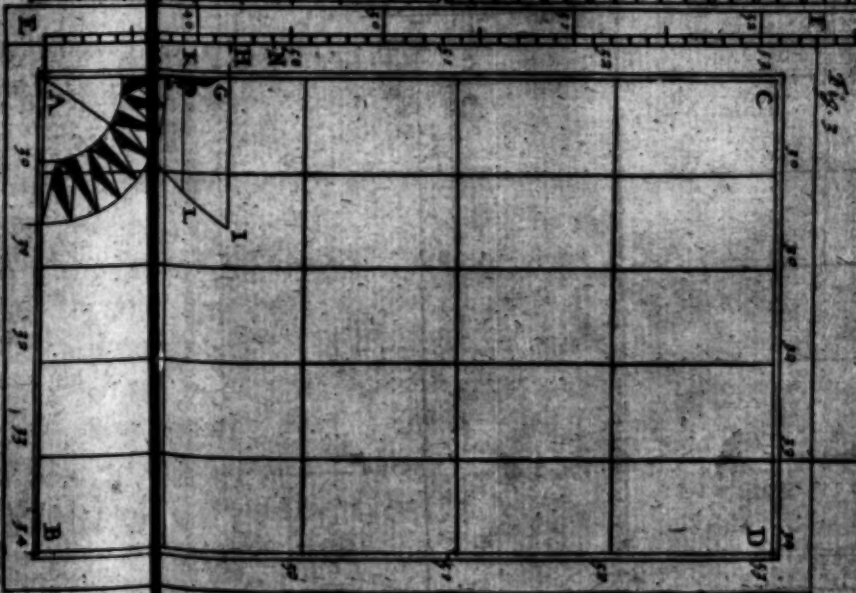
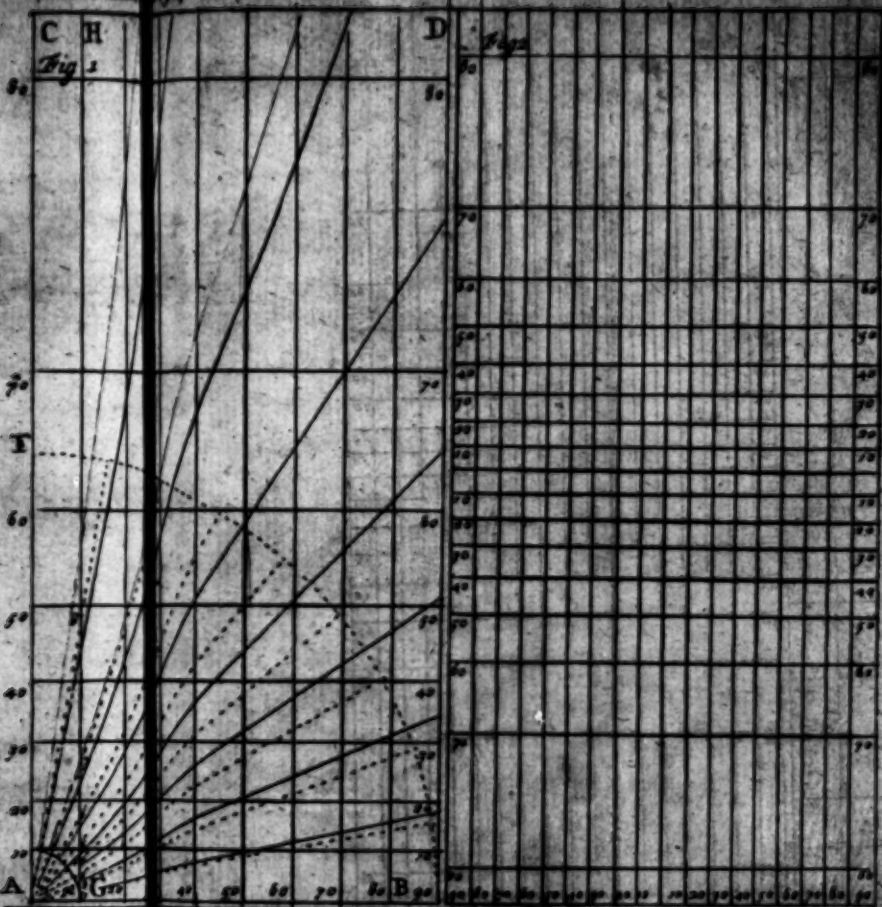
C H A P. XVII.

To, project *Wright's* (commonly call'd
Mercator's) Chart.

Method 14. Plate 14.



THIS admirable Contrivance having confer'd such Honour upon the Author, no Wonder that we find two of the most eminent Mathematicians in the Age it was produc'd, contending for it: The Truth is, Mr. *Wright* having found out this Method, communicated it too freely to *Mercator*, who publish'd a Chart thereupon, and, *Battillus* like, took the Invention of it to himself, as Mr. *Wright*, in his Correction of vulgar Errors, has sufficiently prov'd. But to secure one's Name as long as Navigation lasts, could be no small Temptation to Mortals fond
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of Fame; the Author having, by this Invention, rais'd to himself a more durable Monument than that of Brass or Stone.

Mr. *Wright* considering that all circular Projections, or those depending on Perspective, were unfit for Sea Uses, because the exact Bearing and Distance cannot be found thereby, without much Trouble; he suppos'd a Globe with the usual Delineations posited in a concave Cylinder, to be blown like a Bladder, 'till every Part of the Surface touch'd or adhear'd to the Cylinder. Thus would each Parallel have the same Diameter with the Equator or Cylinder, and the Meridians becoming Parallel to each other, would in all Latitudes have the same Distance as on the Equator. In short, the Rhumbs, and all other Circles of the Globe, would unbend into strait Lines.

Since Mr. *Wright's* Time, many Improvements have been made in the Manner of projecting this Chart; which, how to perform, I shall shew five several Ways, viz. 1. Geometrically; 2. By Scale; 3. By the Line of Secants on a Sector; 4. By the Line of Lines on a Sector; (these three Ways are

are Instrumentally) and 5: Arithmetically.

Method 1. *To project the Nautical Chart Geometrically.*

Draw the Line A B, and divide it into as many Degrees as your Map is to contain in Longitude; then at the Extremities A and B raise Perpendiculars, to which draw parallel Lines at every single, 5th, or 10th Degree of the Equator, as in the Figure for the Meridians.

This done, put one Foot of the Compasses in the Point A, and extending the other to the Point of the first Meridian in the Equator at G; or, for greater Exactness, to some more distant Point, as B 90; describe the Quadrant E B, which divide into 9 equal Parts, and draw Lines from A to each Point of Division; or, to avoid scoring the Paper, only mark where the Ruler cuts the Meridian 10 Degrees distant from the first. Lastly, because the Distances of the Parallels from one another are mark'd by this Artifice in the Line G H, you must transfer them from that Line to the Side

Side Lines A C and B D after the following Manner.

1. Set one Foot of the Compasses in A, and extending the other to the first Point above G, marked 1, transfer the Distance in the Line A C and B D, and draw a Line parallel to the Equator A B, for the 10th Parallel. 2. Taking the Distance between A and the next Point in the Line G H mark'd with the Figure 2, transfer it into the Lines A C and B D, from the Points of the Intersection of the 10th Parallel, for the Breadth of the 20th Parallel, which is express'd by a Line drawn from the Point in the Line A C, to the Point in the Line B C, numbering each with the Figure 20, to denote the Latitude. 3. Extend the Compasses between A and the third Point in the Line G H, and setting off the Distance from the Points of the 20th Parallel, on the Lines A C and B D, draw the 30th Parallel, and Figure it as before. Lastly, follow the same Method in drawing the 40th and 50th, and all the rest of the Parallels; minding (as has been directed) always to place one Foot of the Compasses in the Points of the Parallel immediately going before, and set off the Distance

H between

between that and the ensuing, with the other.

This Method is for drawing general Maps, or finding the Points of each 10th Parallel: But if the Chart be projected large enough, that the Line G H may contain many distinct Points; then may the Quadrant F B be divided into 90 equal Parts and Points, mark'd in the Meridian G H, for each Degree of Latitude.

Method 2. *To project Wright's Chart by the Scale.*

Draw the Line A B, representing the Equator, and from the Line of equal Parts on *Gunter's Scale*, set off towards B as many times ten Degrees as your Map shall contain in Longitude, and draw Lines thro' those Points parallel to each other for Meridians.

Then, on the Meridians A C and B D, from the Scale of Meridional Parts, adjoining to the Line of equal Parts, transfer the Degrees of Latitude, and draw Lines between the corresponding Points for the Parallels.

Method

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Method 3. *To project Wright's, or the true Nautical Chart, by Help of the Line of Secants on a Sector.*

This and the following Method, both depending upon the Sector, are of all Ways readiest for projecting this Chart. The Meridians being drawn as in the former Methods; take the Extent of ten Degrees on the Equator between your Compasses, and rectify the first Points of the Secants upon your Sector to that Distance: Then take the Distance between ten Degrees in the Secants, and set it off from A and B on the Meridians A C and B D for the first ten Degrees of Latitude, and draw the Parallel between the Points. Next (the Sector remaining in the same Position) take the Distance between the Points of 20 Degrees in the Line of Secants, and setting one Foot in the Points of the said 10th Parallel in the Meridians A C and B D, transfer the Distance thereon, for the Breadth of the 20th Parallel. The Distance between the Points of 30 Degrees apply'd the same Way, will be the Breadth

H 2

Breadth of the 30th Parallel ; and so of all the rest.

But if you would draw Parallels at every Degree of Latitude ; for Instance, Suppose your Map was to contain five Degrees of Latitude from the 48th to the 53d Degree ; take the Space of a Degree of Longitude between the Compasses, and rectify the first Points of the Secants on the Sector to that Distance ; then take the Distance between 49 and 49 in the Line of Secants, and apply from A towards C, and from B towards D. Next (the Sector lying open in the same Position) transfer the Distance between 50 and 50 in the Line of Secants upon the Meridian Lines A C and B D. From the Points of 49 Degrees in the said Lines, set off 51, 52, and 53 Degrees the same Way.

Method 4. To project the true Nautical Chart Instrumentally another Way, viz. by the Line of Lines.

But because a Line of Secants is not to be found on all Sectors, I shall shew

shew how it may be perform'd by a Line of Lines, which none are without.

Find in the Table of decreasing Longitude, the Quantity of a Degree in the 49th Parallel of Latitude, $39' 20''$; then take the Extent of a Degree of the Equator between your Compasses, and rectify the Points of $39' 20''$ in the Line of Lines to that Distance. This done, take the Distance between 6 and 6 in the said Line, and lay from A and B, upon the Meridians A C and B D, for the Extent of the 49th Degree, and draw its Parallel. Next you will find in the Table, the Quantity of a Degree of Longitude in the 50th Parallel to be $38' 32''$; and rectifying, as before, the Points of $38' 32''$, in the Line of Lines, to the Extent of a Degree of the Equator, take the Distance between 6 and 6 in the said Line of Lines, and set it off from the Points 49 in the Meridians A C and B D for the 50th Degree of Latitude, and draw a Line between them for the Parallel; after the same Manner draw the rest, observing that

the Distance between 6 and 6 in the Line of Lines, must always be taken for the Extent of the Degree or Parallel you want, having first rectify'd the Points of the Minutes and Seconds, which a Degree of Longitude contains in that Parallel, to the Extent of a Degree of the Equator,

Method 5. *The Arithmetical Projection of the Nautical Chart, by a Table of Meridional Parts.*

Let it be requir'd to draw
Fig. 3. a Map containing five Degrees of Latitude, and as many of Longitude. Draw the Line A B; which divide into five equal Parts, or Degrees of Longitude, on which erect Perpendiculars or Meridians. Then divide each Degree of Longitude in the Line A B into 60, or if the smallness won't allow it, into 10 equal Parts, each containing six Geometrical Miles. This done, find the Meridional Parts for the Latitudes 48 and 49, which are 3291 and 3382, the Difference is 91 Meridional Miles, or
 one

one Degree $31'$, which take from the Line A B, and apply from 48 to 49, on the Lines A C and B D; then draw the Parallel of 49, and go on to find the Meridional Miles answering to 50, and subtract the Meridional Miles of 49 from them, the Difference is 92 Miles, or $1^{\circ} 32'$; which set off from 49 to 50, and draw the Parallel: The same Way describe the 51st, 52d, and 53d Parallels, always observing, that the Difference between the Meridional Parts of the Latitude sought, and the preceding Latitude, is the Quantity of the Degrees of Latitude requir'd,

There are other Ways prescrib'd by *Wright*, *Gunter*, *Norwood*, and others, for projecting this Chart, but they are both difficult and obsolete. I design'd at first to have given the Use of this Chart compleat, but considering it would be of Use only to Navigators, who may find what is for their Purpose in most Books of Navigation, as *Newhouse*, *Newton's Idea*, &c. to which I refer them; I shall only shew how to find the Bearing and Distance of Places, which is as

much as is needful to the Geographical Student.

Mr. *Newton* makes use of a **Fig. 3.** Scale, call'd the Auxiliary Line, for working Questions in Navigation by this Chart, mark'd **E F**; 'tis compos'd of equal Parts or Degrees, each of which must be equal to two Degrees in the Line **A B**, and divided also into 10 equal Parts; the Degrees in this Scale must be of the same Denomination with the Degrees of Latitude in the Chart: Thus, if the first Degree in the Map be 49, the first Degree in the Scale must be figur'd 49, the next Degree in both with the Number 50, and so on. Suppose then, it was requir'd to find the Course and Distance between **A** and **L**.

1. Draw a Line from **A** to **L** and you find the Bearing to be **N E** by **N**.

2. To find the Distance, draw the Parallel **K L**, whereby it appears that **L** lies in the Latitude $49^{\circ} 10'$; which Degree and Minute seek in the auxiliary Line **E F** adjoining, where you will find it at **H**; then from **H** draw

G I

GI parallel to AB, to cut the Line AL continu'd in I, and apply AI upon the auxiliary Line from E to N; so shall EN $1^{\circ} 24'$ be the Distance requir'd between A and L.

There are other Ways of finding the Distance, but they being so troublesome, and this so easy, made it needless to insert them.



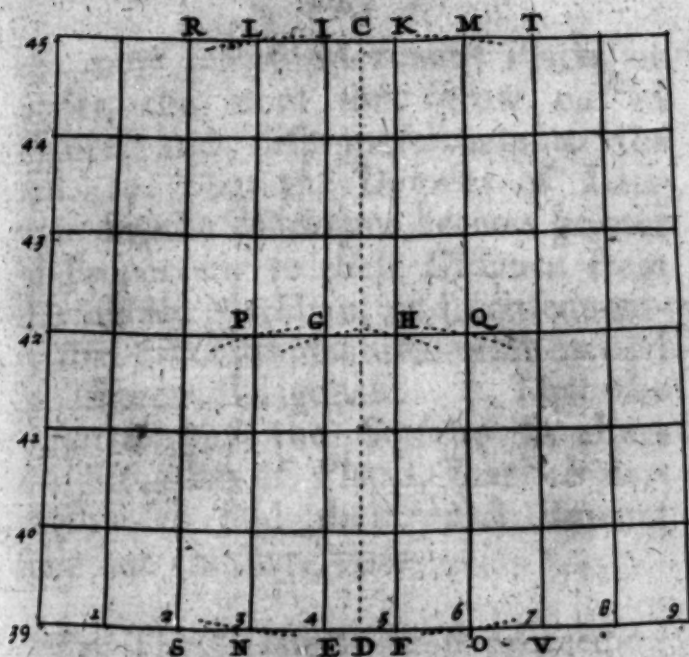


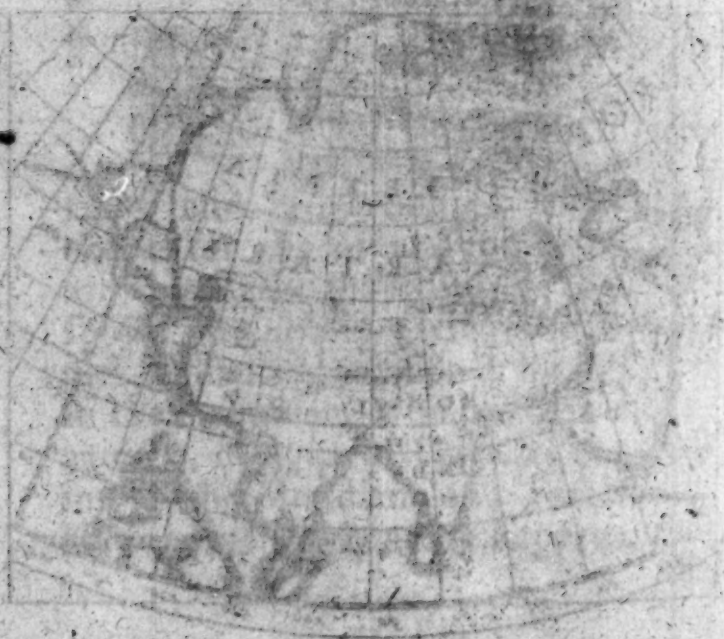
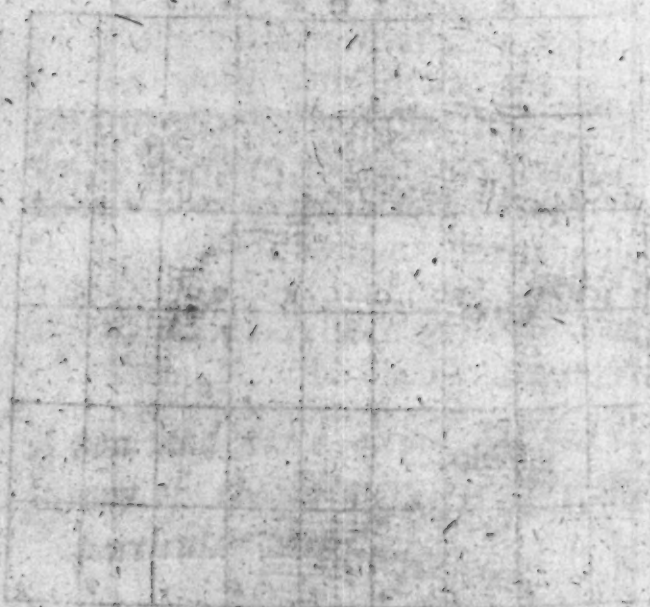
C H A P. XVIII.

*A new and more exact Method than
any of the former, for projecting
particular Maps.*

Method 15. Plate 15.

SIR **H**O' Wright's Chart be
most true, yet hath it this
Disadvantage of distort-
ing the Figure, Magni-
tude, and Proportion of Countries;
and as for the other Projections, they
are not only defective in these Re-
spects, but also in giving the Bearing
and Distance, occasion'd by a Defect
in the Projection, which causes the Di-
agonals, or Squares, made by the cross-
ing of the Meridians and Parallels to
be unequal ; whence it happens, that
the





the more remote Meridians Places lie under, the more they grow out of Figure, and disproportionate to the rest. 2. That the Degrees of Latitude in the Meridians become greater in Proportion to their Distance from the middle Meridian, and consequently that different Measures must be us'd in different Diagonals. 3. That the Distortion of the Squares so alters the Situation of Places, that 'tis impossible to find their exact Bearing from one another.

§ 2. These Defects then proceeding chiefly from the Irregularity of the Squares, I consider'd, that to remedy them, was to find out a Way to project the Meridians and Parallels so, that in their Intersection they might form equal Diagonals throughout, as appears by the Figure; the Manner of projecting which is as follows.

§ 3. The Projection of a Quadrant of an Hemisphere according to this Method, differs from the 9th only in this, that the Parallels are concentrick Circles, respecting the Pole

as their common Center, and herein it has some Affinity with the polar Projection. But particular Maps require a particular Projection: And because we don't institute this for general Maps, (tho' it be much preferable to any other Way) in Regard there will be some Error in it, occasion'd by the too great Contraction of the Meridians, if the Map exceed 15 or 20 Degrees of Latitude; therefore we shall give an Example of a particular Projection, the Map of *Asia* sufficing to shew the Nature of a general one. Observe that the Center of the 60th Parallel is just 30 Degrees beyond the Pole, or the same Distance from that Parallel as the Equator; and that in every Projection, the Center for one Parallel, is the Center for all. But in Projections of different Portions of the Earth, the same Parallel has different Centers.

§ 4. But because it is not only very troublesome to find the Centers for the Parallels, but also to little or no Purpose when done, for want of Instruments large enough to describe

describe Arches of the Extent requir'd in particular Maps; therefore I shall substitute a Method abundantly more practicable and easy, and withal no less exact.

§ 5. Suppose you would draw a Map of some Part of the Earth, containing six Degrees of Latitude, viz. from the 39th to the 45th Parallel, let the Longitude be what it will.

1. Draw the Line EF, and in the Middle raise the Perpendicular DC, which divide into 6 equal Parts, or Degrees of Latitude, and thro' C draw a Line parallel to EF.

2. Divide a Degree into 10, or, if large enough to admit it, into 60 equal Parts; and, in the Table for decreasing Longitude, Part 2. Chap. 3. find the Content of a Degree of Longitude in the Latitude of 39 Degrees, viz. $46' 36''$.

3. From the Degree so divided take the Parts $46' 36''$, divide that Distance, and from D set off one Half to E, and the other Half to F.

4. Find

4. Find the Content of a Degree in the Latitude of 45, viz. $42' 24''$; take that Distance from the Scale of the Degree; divide it; and from the Point C lay one Half to I, and the other Half to K as before.

5. Draw strait Lines from I to E, and from K to F; divide them into like Parts with C D, and thro' those Marks draw parallel Lines. Thus I K E F is a Projection for one Degree of Longitude, including six Degrees of Latitude.

§ 6. Then because all the Degrees, or Diagonals, are to be equal, and consequently that the Projection of them is only a Repetition of the same Thing over again; therefore, all that is to be done is to consult the easiest Way for transferring I K E F upon the Paper, as often as there will be Occasion, which may be effected any of the following Ways.

1. If the Compasses be large enough, or the Projection will admit it, take the Distance from E to K, or from F to I; and setting one
Foot

Foot first in E, and then in F, describe the Arches L and M.

2. In like Manner, set one Foot first in I, and then in K, and with the same Extent draw the Arches N and O.

3. Take the Distance (with another Pair of Compasses) between E and F, and set from E to N, and from F to O.

4. Likewise set the Distance between I and K, from I to L, and from K to M.

5. Draw Lines between L and N, and M and O ; divide them into Degrees, and draw Parallels from those Points to the corresponding Points in the Meridians I E and K F. After the same Manner may Meridians and Parallels be drawn to as many Degrees of Longitude as your Map contains.

§ 7. If the Map be very large, so that the Compasses cannot extend to the farthest Degree, or from F to I; then you may draw one or more Diagonals as you can conveniently at once ; and when you have done them, proceed 'till you finish the rest.

rest. Thus when you have made the Squares P G N E, and H Q F O, after the prescrib'd Method, go on to draw L I P G, and K M H Q.

§ 8. Another Way for repeating the Projection I K E F.

To supply the Defect of Compasses, you may use a thin Scale, or Rule, of a convenient Length; let it be of Brass or Steel, rather than Wood. In the Edge of this Rule, near one End, there must be a Nick made, like that in the Edge of a Protractor, to fix a Pin or Needle in: In drawing your Projection it is thus to be us'd.

1. Fix the Nick in the Edge of the Ruler, with a Pin or Pricker upon the Point at F, and mark the Place in the same Edge, where the Point at I touches it.

2. Laying another Pricker at the Mark, move the Ruler towards the right Hand of the Meridian K F, and draw the Arch at M.

3. Transfer the Nick in the Ruler to K, and fixing the Pricker at the same Mark, describe the Arch at O.

4. In like Manner, transfer the Ruler first to E, and then to I, and draw the Arches L and N.

5. Take the Distance between E and F, and transfer it from E and F, into the Arches N and O, and draw Lines between them. Also set off the Distance of I and K from I to L and from K to M, drawing Lines between.

6. From the Points L and M draw Lines to the Points N and O in the lower Arches; divide the Meridians LN and MO into like Parts with the Meridians IE and KF, and draw Lines between the corresponding Points.

7. Proceed to draw the Diagonal RSLN and MTOV after the same Manner, and so on 'till all the rest be projected.

§ 9. A third Way for transferring the Diagonal IKEF several Times into the Projection.

According to this Method, the Diagonal IKEF must first be drawn on a Slip of thick Paper, then transfer it upon your Map thus.

1. Lay the Slip of Paper upon the Middle of your Sheet on which you would transfer it, and with a Needle prick off the Points I K E F into the Sheet.

2. Then you may either prick down all the Points of the Parallels in the Meridians I E and K F, before you stir the Paper, or,

3. Taking off the Slip of Paper, draw Lines between the four Points I K E F; and then dividing the Meridians I E and K F into like Parts with the same Lines in the Slip, draw Lines between for the Parallels.

4. With two Prickers fasten the Points K F in the Slip, upon the Points I E in your Map, and prick off the Points in the Side I E upon your Paper, which will be the Points for the Parallels in the Meridian L N; and from these Points draw Lines to the corresponding Points in the Meridian I E, as also a Line from E to N.

5. Draw the Diagonal R L S N, and all others in the Projection the same Way.

§ 10. If you would be more nice than needs, you may draw the Meridians by Help of a Table for decreasing Longitude, according to Method 8. § 3. But if the Projection exceed not ten or fifteen Degrees, there will be no sensible Difference between them and strait Lines. Note, that, for Expedition Sake, all the Diagonals may be prick'd off, or transferr'd into the Map, before the Meridians and Parallels be drawn thro' their respective Points.

§ 11. In this Projection then you see, the Diagonals being all equal, the Number of Meridians causes no Defect in the Representation, as in other Projections; but Places lying in the remotest Longitudes or Diagonals, are as truly exhibited as those near the Middle, and consequently their Distances conformable to one common Measure; so that the Compasses extended between any two Places, and apply'd to the Scale, gives the Distance without any more ado.

'Tis true, if Places be very remote, it will want something, tho' scarce

sensible, of that Exactness, as would be found, were their Distance not exceeding a Degree or two, for then it would be as exact as easy. But other Projections can't pretend even to that it self, for in the irregular Squares, the exact Distance of Places, tho' but half a Degree asunder, is not to be found with the Compasses, and yet that is the only Way of finding it without Difficulty.

In like Manner this Projection has the Advantage of all others (*Wright's* excepted) in finding the true Course, which also in them is obstructed by the Inequality of the Diagonals; tho' it is not pretended that the Bearing will be found here to an exact Truth, if the Difference of Longitude be above a Degree or two. The Bearing is readiest found by a Protractor, or Compass, drawn on Paper: Settle the Center of either upon one of the Places, and the North and South Points parallel to its Meridian; then drawing a Thread from one to the other, mark the Point where it cuts the Protractor or Compass, and that will give you the Bearing.

Note,

Note, the Scale on the Sides will be the Scale for Measuring the Distances on; but it is to be graduated on one of the Meridians, and not on the Out-Lines of the Map, as is done, but falsely, in the Maps now going; tho' indeed it would not mend the Matter much in other Projections, because the Degrees of Latitude in the outward Meridians are larger than those in the middle Meridian, and consequently the same Measure won't serve Places that lie under different Meridians.

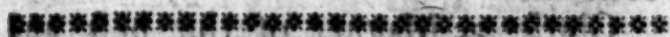


Now, the Scale on the Side will
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tances on; but it is to be extended
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those in the middle Meridian, and
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give Places that lie under different
Meridians.





THE CONSTRUCTION OF GLOBES.



PART II.



CHAP. I.

To make the Magnetical Globe, which may as well in its internal Faculties, as external Model, represent the Globe of the Earth.



THIS Kind of Globe, is by some Geographers very fir-ly term'd a *Terrella*, or little Earth, as differing only in Dimensions from the great Earth, or that we inhabit ; for

it hath its other Properties of Attraction and Verticity (here call'd *Direction*) in common with it. This is the Curiosity of it; and this is as much as can be expected from a Sphere of so small a Size as that of the Load-Stone confines it to. On this Magnetical Sphere, as on other Globes, are describ'd the several Lineaments and Pictures, representing the superficial Figure of the Earth; which how to perform, observe the following Directions.

Chuse a Magnet of the best and largest Sort: Those that come from *Bengal in the East Indies, and China*, are freest of Heterogeneous Mixtures, which are ordinarily the Cause of the Inefficacy in Load-Stones. Let it be ground to an exquisite Roundness, and bor'd through the Poles, wherein two small Pieces of Iron Wire must be fix'd for the *Axis*, on which the *Terrella* is to turn within the Brazen Meridian: If you have a Mind, you may annex the several Appurtenances as belong to common Paper Globes; for which, see Chapter III.

3. The chief Difficulty is in finding the Poles, Parallels, and Meridians of the Magnet; all which may be perform'd by a magnetical Needle in the following Manner. Various Ways there are for finding the Poles of a Load-Stone; first, A thin Piece of Steel about an Inch long, and half an Inch broad, being bent circular, and laid on the Stone, will conform it self parallel to the *Axis* and Point whereabout they lie. Then to find the immediate Point of their Situation, move the Needle gradually toward the suppos'd Point, which, in its Approaches, will erect one End, till it become due perpendicular, where will be the true Point of the Pole. Or you may find the Pole, by hanging the Needle a little short of the Stone by a Thread over the Spot where you judge the Pole lies; and the End will direct to the exact Polar Point. Observe, that if the North End of the Needle point out the Pole, then is that the North Pole of the Stone, and the contrary; for the South End of the Needle will retreat from the North Point of the Stone put of a natural Antipathy in the Poles

Poles to each other. Also thus: A Load-Stone being put into a little Boat of Wood or Cork, and set to float upon the Surface of the Water, will conform its Poles to those of the World. Likewise by marking the Position of the Stone in the Mine, the Poles thereof may be known; for that Part in the Mine which was situate North, will respect the South, and contrary. These two last Ways shew both their own, and the Poles of the World at one Time. The Meridians are discover'd by hanging the Needle over the *Terrella*, which will immediately point to the Poles lying even with the Meridian Line. The *Magneto*, or great Parallel, may be found by observing the individual Point where the Needle shall lie parallel to the *Axii*. The *minor* Parallels, by the Angles which the Needle makes with the Poles; which some have found to answer, in Proportion as the Degrees of Latitude incline towards the Poles, and Tables have been accordingly calculated by several ingenious Men; the latest, I think, are those set forth by Mr. *Henry Bond*, (in his *Treatise of Longitude found*)

by

by the Name of the *Caroline* Tables; one Design of which, is to shew the Latitude of Places, without the Help of Celestial Observation, only by observing the Declination of the Needle at every Place; and the Degrees of Latitude in the Table, opposite to those of the Declination, will be the Latitude of every such Place.

The *Terrella*, in its Constitution and Uses, exactly agrees with the Earth, or great Magnet: 1. In that is contain'd a like Virtue in it of attracting Bodies. 2. Its Property of *Direction* is answerable to the *Verticity* of the *Globe* of the Earth; for as the Poles of the Earth respect those in the Heavens, which is call'd *Verticity*; so do those of the *Terrella* settle and conform themselves to the Poles of the terraqueous *Globe*, which is what is imply'd by *Direction*. 3. As the attractive Power of the Earth is more efficacious and vigorous nearer the Poles, so in the *Terrella*; for in the same Manner as the Needle has no Inclination to the Poles of the Earth on the Equator, either for Want of Power, or because there the Poles attract with equal Force; so on the *Terrella*

Terrella hath it no Inclination to its Poles, but assumes a parallel Position to the *Axis*. 4. As the magnetical inclinatory Needle does in the Earth make different Angles with the *Axis*, in different Latitudes; so it does in the *Terrella*, in equal Proportion.

The *Terrella*, in its Constitution and
 Ques, exactly agrees with the Earth,
 or great Magnet: 1. In that it con-
 tains a like Virtue in it of attrac-
 ting Bodies. 2. In the Property of Direc-
 tion. 3. In the Property of Repulsion.
 The *Terrella* is also like the Earth in
 its Inclination to the Poles. For in the
 same Manner as the Needle has no
 Inclination to the Poles of the Earth
 on the Equator, either for Want of
 CHAP. IV. Of the Force of the
 and with equal Force, so on the
Terrella.



C H A P. II.

To make Copper or Ivory Globes.

§ I.  O describe the making of the solid Part of Copper and Ivory Globes, is not so much my Business. All I can say in the Matter, is, that I conceive the Copper Globes to be cast in two Concave Hemispheres, and afterwards soulder'd and polish'd with Art; and that Ivory Globes, of no great Magnitude, may be turn'd out of one Piece; but those of the largest Size to be of several Parts, artificially piec'd together, and hollow'd. One Globe only of this Sort can be made at a Time, tho' several may be carrying on of different Sizes, because Places are to be engrav'd or cut in the Surface, and
not

not grav'd Papers apply'd to it; wherefore they are rare and costly, some amounting in Value to 20 or 30 Paper Globes of the ordinary Size, and are Curiosities fit only for the Great and Wealthy.

§ 2. Having put the Globe into a Leath, and par'd away the Irregularities, polish it 'till it turn evenly within a Steel Semicircle of exact half the Circumference of the Globe you intend to make. This Semicircle must be divided between the middle Point of the two Notches (wherein the Iron *Axis* of the Globe must be fix'd, so as to turn round evenly when the Circles are drawing) into 90 Degrees, numbering each 10th Degree, from the Equator towards either Polar Hole, with the Degrees of Latitude.

§ 3. When it is brought to a desir'd Roundness and Politure, fix the *Axis* of the Globe in the Notches of the Semicircle, so as it may move freely within it, as close as possible to the graduated Edge, without touching. Then with a Chizel, Graver, or other fit Instrument, laid with the Point exactly

adly in the Nick, or other Mark, at each 10th or 5th Degree, describe or engrave the Parallels, holding the Instrument steady, and turning the Globe against the Edge thereof, observing for the Equator to make two or three Lines close together, for inscribing the Degrees of Longitude.

§ 4. Your next Care, is to describe the Meridians. By Help of the Semicircle, divide the Equator into 360 Degrees; and choosing a certain Point therein, for that Place through which the first Meridian is to pass, number from thence, Eastward and Westward, every 10th Degree with Figures, to 180, where the Degrees of East and West Longitude meet. This Division of the Equator may as exactly be perform'd by the graduated Horizon, which at that Time covers the Equator. This done, fix the Semicircle once more on the Axis, and along by it, as by the Side of a Ruler with a Tracer, or Graver, through each 10th, 20th, or 30th Degree of the Equator, draw the Meridians from Pole to Pole, allowing a double or treble Line for the prime Meridian; which, by Help
of

of the Semicircle, must be divided into 180 Degrees, and mark'd with Figures at every 5th or 10th Degree on each Side the Equator, towards both the Poles; and thus the Globe will be divided into North and South Latitude, as also into East and West Longitude.

§ 5. Also at the Distance of $23^{\circ} 30'$ from the Equator and the Poles, circumscribe double Lines for the Tropicks and Polar Circles. This is best done when you are describing the Parallels.

§ 6. The Ecliptick is drawn by the Edge of the Horizon, the Globe being elevated to $66^{\circ} 30'$ of Latitude; which must be divided, like the Equator, into 360 Degrees from the first Point of *Aries*; which is the Point of the first Meridian's Intersection with the Equator, and one of those thro' which it passeth, or cuts the Equator. The other Point is in the opposite Meridian, or that Meridian 180 Degrees from the first. The greatest Declination of the Ecliptick Northward and Southward, is $23^{\circ} 30'$, touching the Tropicks

picks of *Cancer* and of *Capricorn*, in the first Points of those two Signs; which Points are found in the Meridians, 90 Degrees distant from the first. On the Ecliptick are usually pictur'd the 12 Signs, 30 Degrees asunder.

If a Load-Stone were fix'd in the Center of one of these Copper Globes, with its Poles parallel to those of the Globe, and Iron Axels proceeding from the Stone to the Surface of the Globe, it would be indu'd with the same Operations as the *Terrella*. In such little Niceties as these, may the Curious please their Fancy, and improve the Invention.

All the Appurtenances, as the Horizontal Frame, or Pedestal, the Brazen Meridian and the rest, (which I shall speak to more particularly in the next Chapter) being prepar'd, the last Thing, and what I shall recommend to you with the greatest Care, is the disposing and inscribing, or graving the Pictures, and Names of Countries and Places, according to their respective Latitude and Longitude. And because the Places are to be immediately engrav'd upon the Surface of this Kind of Globes, I should in this Place recommend the Art of Engraving to all

K

curious

curious Artists and Geographers, by shewing the Necessariness of it to such, in producing their Maps more exact, than they could possibly come from the Hands of Engravers unskill'd in Geography ; but perhaps I may hint this hereafter, in my Advice to Geographers. Places are laid down by a Table of Latitude and Longitude, or from a correct Map thus: Find the Latitude of the Place in the Brazen Meridian, and then bring the Longitude, or Meridian of the Place, exactly under the graduated Edge thereof ; and where the Parallel of the Latitude of the Place, cuts the Meridian of Longitude, that individual Point is the true Situation thereof ; round which describe a $\circ$, and insert the Name of the Place. For picturing Rivers, Bounds of Countries, Coasts, and the like, follow the Directions given in Chap. II. Part I.



C H A P. III.

*The Construction of common vendible,
or Paper Globes.*

THE Difficulty and Tedi-
ousness of making Copper
and Ivory Globes, render-
ing them very dear, and
consequently not common,
Artists, to remedy that Inconvenience,
have contriv'd a Sphere of other
Materials: On whose Convex, the
Surface of the terraqueous Globe, or
Firmament, being first delineated on
Paper, is apply'd; by which Means
many Globes of the same Size may be
made at a Time, and afforded at easy
Rates, for the Benefit of the Publick.
The Method of projecting the Circles
of the Globe on these Papers, is as
followeth,

§ 1. The Arithmetical Work is perform'd thus : As 7 is to 22, so is the Diameter of a Globe to the Circumference. The Diameter is usually given, so that it commonly happens, that the Circumference hath odd Numbers and Parts : Whereas if the Circumference was given in even Numbers, as Inches, it might more easily be divided into Parts. For Example, if the Circumference were 36 Inches, each 10 Degrees of Longitude on the Equator, will be an Inch ; if the Circumference be 54, each 10 Degrees will be one Inch and half ; if 72, every 10 Degrees of Longitude will be two Inches, and so forth. The Diameter does not signify much to be known, because the Projection may be perform'd without it : But for the Sake of the Curious, I shall exhibit both Ways of projecting the Papers. And first, Having the Diameter given of a Globe, viz. 24 Inches, or 2 Feet, to find the Circumference, say, as 7 : 22 :: 24 : to the Circumference, viz. 75.43, the Product in Inches.

2. The Breadth of each Paper, from Pole to Pole, will be just half the Circumference 37.71 Inches ; and the Breadth,

Breadth, or Latitude, from the Equator, to either Pole $\frac{1}{4}$, viz. 18.86 Inches.

3. If the Globical Papers contain in Longitude 30 Degrees of the Equator, 12 of them will cover the Globe; and by dividing the Circumference 75.43 by 12, the Product will shew how many Inches it contains in Longitude, viz. 6.28.

4. If 18 of the Papers go to cover a Globe, each will contain of the Equator, or Longitude, 20 Degrees, or 4.19 Inches.

5. If 24, each will contain 15 Degrees of the Equator, or 3.14 Inches of the Circumference.

6. If 36 Papers are allow'd, each Paper will contain 10 Degrees of the Circumference, or 2.09 Inches.

7. If, lastly, the Globe be so large as to require 360 Papers, that is, one to each Degree of Longitude, then will each Paper contain 1 Degree of the Equator, viz. 209, or $\frac{1}{360} = \frac{1}{360}$ Parts.

§ 2. The second Way is to work upon a given Circumference, which suppose to contain 72 Inches; you may, by the *Rule of Three*, find the Diameter,

ter, which is $22 \frac{1}{2}$ Inches, or almost 23 Inches; but it is needless, since all the Papers bear a Proportion to the Circumference, and the Diameter is not made Use of.

1. Divide the Circumference (for the Breadth of the Papers from Pole to Pole) by 2, the Product is 36 Inches; and consequently half the Breadth, or Distance from the Equator to either Pole, will be 18 Inches. Thus in Plate 17, Fig. 1, the Distance from N to S, taken from the suppos'd Scale of Inches, is 36 Inches, or one half of the Circumference; and the Distance from C to N, or S, 18 Inches, or $\frac{1}{2}$ of the Circumference.

2. If each Globical Paper contains in Longitude 30 Degrees of the Equator, or $\frac{1}{2}$ of the Circumference, it will take up 6 Inches thereof, as I K.

3. If 18 of the Papers go to cover a Globe, each will contain 20 Degrees of Longitude on the Equator, or 4 Inches, as L M.

4. If your Papers be $\frac{1}{3}$ of the Circumference, each will contain 15 Degrees of the Equator, or 3 Inches, as a b.

5. If

5. If they be $\frac{1}{2}$ of the Circumference, each will contain 10 Degrees of the Equator; or 2 Inches, as c d.

6. If there be 72 Papers for covering a Globe, each will contain 5 Degrees of the Equator, or 1 Inch, that is, $\frac{1}{2}$ of the Circumference.

7. If, lastly, the Globe requires 360 Papers, each will contain 1 Degree, or $\frac{1}{4}$ of an Inch.

Thus, by the easy Division of the Papers into Inches, it appears much better to have the Circumference than the Diameter given.

§ 3. Proceed now to the Geometrical Work. (1.) Draw the Diameter W E, and cross it with another from North to South, as N S. (2.) From the Scale of Inches set off from C to N, and to S (the North and South Poles) 18 Inches, or $\frac{1}{2}$ of the Circumference, which divide into 9 Parts, (and each Part into 10 more, for the 90 Degrees of North and South Latitude) by taking two Inches from the Scale, so shall each 10 Degrees contain two Inches. You may likewise transfer the same Points of Division into the Diameter

meter of East and West, or the Equator from C to E, and to W. (3.) Upon C, the Center, strike the Circle NESW, and divide each Quadrant into 90 Parts or Degrees, as you did the Diameters, numbering each 10th Degree with Figures, from the Equator toward the Poles, as 10, 20, 30, &c. Thus the three Points are found thro' which the parallel Circles must be drawn, *viz.* two of them are in the Quadrants NE, NW, and SE, SW, the third is in the Diameter NS.

§ 4. Those that have hitherto treated of Globes, make the Parallels concentrick to the Poles; which Experience shews to be a manifest Error, because, upon Tryal, each Parallel will have its particular Center; and that of the 10th is so remote, that 'tis scarce distinguishable from a right Line. The respective Centers are found thus, by three given Points, or only two Points, provided one be in the Diameter. For Example, to find the Center of the Parallel 60, set one Foot of the Compasses in the Point 80 of the Quadrant NE, extending the
other

other to the Point 80 in the Diameter N C, and strike the Arches D A and D B; change the Point of the Compasses to the Point 80 in the Diameter, and with the same Extent strike the Arches F A and F B. Through the Points of the Intersection of the Arches A and B, draw a Line to cut the Diameter continu'd in the Point G; which being the Center of the 60th Parallel, the Arch F D H may be describ'd upon it. Having thus found the Centers of all other Parallels, and drawn them after this Manner in the Northern Hemisphere, transfer the central Points in the Line C N continu'd, into the Line C S continu'd also; and sweep the Parallels of the Southern Hemisphere. Note, that whether the Polar Papers extend to the 80th or 70th Parallel, those Circles in the meridional Papers, or those that compass the Body of the Globe, must be describ'd as is here order'd; but in the polar Papers the Pole must be the Center, as you see in the Figure, where one Point of the Compasses being fix'd in the South Pole S, and the other extended to the 80th or 70th Degree of Latitude
in

in the Diameter, strikes those Parallels in the polar Papers. See more concerning the polar Papers hereafter.

Then, because the polar Circles and Tropicks are but Parallels $23^{\circ} 30'$ distant from the Poles and Equator; at those Distances describe double Lines, representing such Circles, to distinguish them from other Parallels.

§ 5. This done to draw the Meridians, proceed thus; having chose one of the Proportions mention'd § 2, for the Content of the Equator in each Paper, we will assume $\frac{1}{4}$ of the Equator or Circumference, which is the common Proportion in globical Papers, and the greatest Longitude that can be allow'd, what Magnitude soever the Globe may be of. Then, because $\frac{1}{4}$ of the Equator contains 30 Degrees of Longitude, which, in the Papers for a Globe of 72 Inches Circumference, are six Inches in Measure, (1.) from the annex'd Scale of suppos'd Inches, take three Inches between the Compasses, and lay on the Equator or Diameter of East and West W.C.E from C to K, and from C to I, the

I, the Length from I to K being six Inches, or 30 Degrees of the Equator, into which it must be divided, and number'd at each 5th or 10th Degree, with the Degrees of Longitude. (2.) Because a single Degree cannot be conveniently divided into Parts in so small a Projection, and seeing any Quantity of Degrees in any Parallel, bears the same Proportion as doth one Degree to the same Quantity of Degrees on the Equator; therefore take 15 Degrees of the Equator, viz. IC or IK; and having transferr'd the Distance to a waste Paper, divide it, as you would a single Degree, into 60 Parts. (3.) Look in the following Table what Proportion a Degree (or 15 Degrees) in each 5th or 10th Parallel of Latitude, has to a Degree (or 15 Degrees) on the Equator. For Example, in the first Column of the Table towards the left Hand, are the Degrees of Latitude; over against the 10th Degree I find 59 Miles in the second Column, and 60 Minutes or Fractions of a Mile in the third Column, which signifies that a Degree (or 15 Degrees) in the 10th Parallel of Latitude, contains but 59 Miles
60 Minutes

60 Minutes of a Degree (or 15 Degrees) of the Equator; which Content I take from the Scale IC or CK between my Compasses, and set off on each Side the Meridian or North and South Diameter of the Paper NS upon the 10th Parallel. Again, in Parallel the 20th I find a Degree to contain 56 Miles 24 Minutes, or Parts of a Mile, of a Degree on the Equator, and transfer that Proportion from the said Scale upon the 20th Parallel; the like is to be understood of all the rest. The same Directions must be follow'd in all other Proportions for the Breadth of the globical Papers; in chusing of which, observe, that as it is obvious both from the Figure and the Globe it self, that a Paper so large as $\frac{1}{11}$ of the Circumference, cannot possibly lie upon the Convex, without crumpling, lapping over, or tearing, in the Application; therefore, it will be better to use some other Proportion, viz. LM, *ab*, or *cd*; for note, the narrower they are, the more exact they will fit the Globe, especially if it be any thing large.

§ 6. Thus you have given the geometrical Way of Projecting the globical Papers: *Fig. 2.* But for the Sake of such who either have not convenient Instruments at Hand, or are not willing to follow these troublesome Rules, I shall substitute another Way of performing this Projection, which is preferable to the former for Ease, and, if Care be taken, is nothing behind it for Exactness. Having us'd the same Proportions in this, (which, for Convenience, is projected large) as in *Fig. 1.* PE being divided in 90, and AB into 3 equal Parts or Degrees, proceed thus: (1.) Fix one Leg of the Compasses in P, the Polar Point, first extend the other Leg to 80 Degrees in the Perpendicular, and sweep a Circle, and then sweep another thro' the Point of 70 Degrees, which is usually the Circumference of the polar Papers in most Globes. (2.) But tho' the Pole is the Center of the Circle of Latitude 70 in the polar Papers; yet, as I observ'd § 4, that Circle has a more remote Center in the meridional Papers, or those that
cover

cover the Body of the Globe. There-
 fore next remove one Foot of the
 Compasses 20 Degrees beyond the
 Pole in the Point F, and extending
 the other to the Point of the 70th
 Parallel in the Perpendicular EP,
 sweep the Arch CGD. This done,
 separate the polar Paper from the
 meridional. (2.) In the same Man-
 ner as is observ'd § 5. (2.) supposing
 AE to be a Degree divided into 60
 Parts or Miles, take from thence, out
 of the following Table, the Quan-
 tity of a Degree in each 5th or 10th
 Parallel in equatoreal Miles, and
 sweep Circles, or only Arches to the
 Right and Left, upon the respective
 Centers of each such Parallel, in the
 Perpendicular EP mark'd with Pops,
 (3.) The Circle describ'd upon G,
 the Point of the 70th Parallel, cuts
 the Arch or Parallel of Latitude for
 70 Degrees in the Points C and D;
 therefore divide the Space between
 AC and BD into seven equal Parts,
 minding to fix the Points of the Com-
 passes, as you go along, directly upon
 the Stroke of the Arches, that the
 Papers may neither be too narrow nor
 too broad, which will be equally in-
 convenient

convenient in applying them to the Globe. (4.) Draw Lines between the Points of Division as nice as possible, to form the Meridians more exact. (5.) In drawing the Parallels from 10 to 30 Degrees of Latitude, strait Lines will answer well enough, if the Projection be small; the rest may be drawn more circular by an even Hand, tho' some would have strait Lines serve for all, seeing the Difference is insensible between a Right and a Curve, especially if the Longitude of the Paper do not exceed $\frac{1}{4}$ of the Circumference. (6.) If the Parallels were drawn in their due Decrement to every single Degree, the Curve for the Meridians would be much truer, which are not Arches of Circles as they lie in *Plano*, yet form Circles when spread on a spherical Convex.

A Table

*A Table shewing in what Proportion the
Degrees of Longitude decrease in each
Parallel of Latitude.*

	Lat.	Mil.	Min.	Lat.	Mil.	Min.	Lat.	Mil.	Min.
Equator	0	60	0	31	51	24	62	28	8
Parallel	1	59	56	32	50	52	63	27	12
	2	59	54	33	50	20	64	26	16
	3	59	52	34	49	44	65	25	20
	4	59	50	35	49	8	66	24	24
	5	59	46	36	48	32	67	23	28
	6	59	40	37	47	56	68	22	32
	7	59	37	38	47	16	69	21	32
	8	59	24	39	46	36	70	20	32
	9	59	10	40	46	0	71	19	32
	10	59	0	41	45	16	72	18	32
	11	58	52	42	44	36	73	17	32
	12	58	40	43	43	52	74	16	32
	13	58	28	44	43	8	75	15	32
	14	58	12	45	42	24	76	14	32
	15	58	0	46	41	40	77	13	32
	16	57	40	47	41	0	78	12	32
	17	57	20	48	40	8	79	11	28
	18	57	4	49	39	20	80	10	24
	19	56	44	50	38	32	81	9	20
	20	56	24	51	37	44	82	8	20
	21	56	0	52	37	0	83	7	20
	22	55	36	53	36	8	84	6	12
	23	55	12	54	35	26	85	5	12
	24	54	48	55	34	24	86	4	12
	25	54	24	56	33	32	87	3	12
	26	54	0	57	32	40	88	2	4
	27	53	28	58	31	48	89	1	4
	28	53	0	59	31	0	90	0	0
	29	52	28	60	30	0			
	30	51	56	61	29	4			

The Circumpolar Papers were formerly not cut out by themselves, 'till Artists finding no small Difficulty in making the Points of the Paper fall nicely into the Pole, to help that Inconvenience, projected all within the Polar Circles in one Piece, whereof the Parallels were Circles, and the Meridians strait Lines; yet finding still so big a Plane not fit the Globes Convexity, but wrinkle about the Edges, they have contracted them between the Pole and the Parallel of 70. But neither will it do yet, because the Longitude encreases disproportionally the further off the Pole. If the Polar Projecture include from the Pole 10 Degrees only, it will lye flat upon the Convex, without any sensible stretching or contracting, being equally divided into 24 Parts; but if it extend to, or beyond the 70th Parallel, you must take another Course: Therefore from the Point G or F, divide the Circle into 12 equal Parts; or which is the same, continue every other Meridian in the Parallel 80 to the Parallel 70, and by the following Table set off on each side these 12 Meridians, the true Longitude of each 10 Degrees in that Parallel; or which will save the Trouble, transfer the Distance from C to G, or from G to D upon the Parallel 70 in the Polar Paper, for that is the

L true

*A Table shewing in what Proportion the
Degrees of Longitude decrease in each
Parallel of Latitude.*

	Lat.	Mil.	Min.	Lat.	Mil.	Min.	Lat.	Mil.	Min.
Equator	0	60	0	31	51	24	62	28	8
Parallel	1	59	56	32	50	52	63	27	12
	2	59	54	33	50	20	64	26	16
	3	59	52	34	49	44	65	25	20
	4	59	50	35	49	8	66	24	24
	5	59	46	36	48	32	67	23	28
	6	59	40	37	47	56	68	22	32
	7	59	37	38	47	16	69	21	32
	8	59	24	39	46	36	70	20	32
	9	59	10	40	46	0	71	19	32
	10	59	0	41	45	16	72	18	32
	11	58	52	42	44	36	73	13	32
	12	58	40	43	43	52	74	16	32
	13	58	28	44	43	8	75	15	32
	14	58	12	45	42	24	76	14	32
	15	58	0	46	41	40	77	13	32
	16	57	40	47	41	0	78	12	32
	17	57	20	48	40	8	79	11	28
	18	57	4	49	39	20	80	10	24
	19	56	44	50	38	32	81	9	20
	20	56	24	51	37	44	82	8	20
	21	56	0	52	37	0	83	7	20
	22	55	36	53	36	8	84	6	12
	23	55	12	54	35	26	85	5	12
	24	54	48	55	34	24	86	4	12
	25	54	24	56	33	32	87	3	12
	26	54	0	57	32	40	88	2	4
	27	53	28	58	31	48	89	1	4
	28	53	0	59	31	0	90	0	0
	29	52	28	60	30	0			
	30	51	56	61	29	4			

The Circumpolar Papers were formerly not cut out by themselves, 'till Artists finding no small Difficulty in making the Points of the Paper fall nicely into the Pole, to help that Inconvenience, projected all within the Polar Circles in one Piece, whereof the Parallels were Circles, and the Meridians strait Lines; yet finding still so big a Plane not fit the Globes Convexity, but wrinkle about the Edges, they have contracted them between the Pole and the Parallel of 70. But neither will it do yet, because the Longitude encreases disproportionally the further off the Pole. If the Polar Projecture include from the Pole 10 Degrees only, it will lye flat upon the Convex, without any sensible stretching or contracting, being equally divided into 24 Parts; but if it extend to, or beyond the 70th Parallel, you must take another Course: Therefore from the Point G or F, divide the Circle into 12 equal Parts; or which is the same, continue every other Meridian in the Parallel 80 to the Parallel 70, and by the following Table set off on each side these 12 Meridians, the true Longitude of each 10 Degrees in that Parallel; or which will save the Trouble, transfer the Distance from C to G, or from G to D upon the Parallel 70 in the Polar Paper, for that is the

L true

true Content of 10 Degrees in that Parallel: And as may easier be conceiv'd from the Figure it self, there will lye between each 12th Part a narrow slip of Paper which must be cut out, and then the Projecture being laid upon the Globe, the Parts will naturally close: Whereas for want of this Care taken, we commonly see the Polar Papers wrap over and wrinkle; besides the Points of the Meridians seldom meet those in the Meridional Papers, except now and then by Chance.

Fig. 1. From this one rough Draught you may transfer the Dimensions upon the rest of the Papers which go to make the Globe; and this saves the Trouble of projecting a new Scheme for every Part or Division. Observe to do it with exquisite Care, for a small Error (tho' inexplicable in a single Paper) will yet, when they are all joyn'd, appear very visibly. Then because the Parts in all make 12, you may divide your Projections upon three Sheets of large Paper, allowing four Parts to each Sheet. (1.) Draw an East and West Diameter thro' every Sheet representing the Equator, in each of which set off the Distance from I to K, *Fig. 1.* with your Compasses four times, without shifting the Points. In the middle of each
erect

erect Perpenders, and transfer 70 De-
 grees thereon (allowing the Polar Papers
 to include 20 Degrees from the Poles)
 Northwards and Southwards from the
 Center, which is the Intersection of the
 Equator, with the Perpendiculars, or strait
 Meridians, for Northern and Southern
 Latitude. (2.) From the President take
 the Distance between the Point of each
 10th Parallel in the Perpenders, and in
 the Meridians AC and BD, and in the
 fair Draught describe Arches to the right
 and left, upon the Points in the Perpen-
 diculars. (3.) Then placing one foot of
 the Compasses in the Point A or B, ex-
 tend the other to the Point of the Meri-
 dians and Parallels Intersection; and as
 you go along transfer the Distances upon
 the Copies from the corresponding Points
 of the Equator into the Arches, and the
 Place where they cut will be the Points
 thro' which the Meridians and Parallels
 must be drawn, the same way as in the
 President. And that Meridian among all
 the Papers which you pitch upon for the
 first, let be divided equally from the E-
 quator to C, and then in the Polar Papers
 to the Poles, into Degrees, or Minutes,
 numbering each 5th or 10th Degree with
 the Degree of Latitude, minding to draw
 three Lines to distinguish it from other Me-
 ridians,

ridians, between the left and the middle Line must the Degrees be graduated, and Minutes between the middle and the right Hand Line. The same must be observ'd in describing the Ecliptick, or Equator; on which last, ev'ry 5th or 10th Degree, till you come to 180 Degrees, must be figur'd Eastward and Westward of the first Meridian; for a 180 Degrees is the greatest Distance of any Meridian from the Prime, and it is better doing so than to follow the old, or common way of counting Longitude from East to West round the Globe, for besides its being undisputable, that any other Meridian must be nigher the first, either Eastward or Westward, it is absurd to imagine the same Meridian to be 360 Degrees distant from it self, and is irreconcilable as well with Geometry as good Reason.

When all the Papers are finish'd, so far as relates to the Circles of the Globe, you must draw the Ecliptick; and because that Circle intersects the Meridian in certain Points called the Declination, and the Meridians cut the Equator in the Degrees of right Ascension; therefore by help of a Table of Declination and right Ascension corresponding to each other, find the Declination over against the right Ascension, which shews through what Part of the

the Meridians the Ecliptick Arches must pass; and draw strait Lines through the Points of Intersection, which Lines (tho' strait as they lye in *Plano*) will form Curves of the Ecliptick Circle on the Globe. This Circle is divided into 360 Degrees, like the Equator, which it cuts at two Points, the first at the beginning of *Aries*, where the first Meridian cuts the Equator, the other in the Intersection of the opposite Meridian, 180 distant, at the Entrance into *Libra*; North of the Line. It extends as far as the beginning of *Cancer*, in the Tropick of that Name; and South as far as the same Point of *Capricorn*; between these two Points dispose the intermediate Signs, each 30 Degrees asunder.

A TABLE of Right Ascension and Declination.

			D. M.	D. M.
Aries,	15	♈	13 48	5 56
Taurus,	0		27 54	11 30
Taurus,	15	♉	42 31	16 23
Gemini,	0		57 48	20 12
Gemini,	15	♊	73 43	22 39
Cancer,	0		90 00	23 30
Cancer,	15	♋	106 17	22 39
Leo,	0		122 12	20 12
Leo,	15	♌	137 29	16 23
Virgo,	0		152 6	11 30
Virgo,	15	♍	166 12	5 56

Seek the Right *Ascension* as you would Longitude, and *Declination* as Latitude, and where they intersect, is the respective Point of the Ecliptick.

Proceed next to insert the Stars in the Papers, or Gores (as Artificers term them) of the Celestial-Globe, and Places of the Terrestrial, by help of most approv'd and correct Astronomical and Geographical Tables and Maps, according to their respective Longitude and Latitude, which may easily be effected by finding the Meridian and Parallel of the Star or Place; and the Point where they intersect each other, will be the exact Situation thereof.

In

In picturing the Coasts, Rivers, Lakes, Mountains, Cities, Towns, &c. observe the Directions given in the second CHAP. the Rhumb Lines may be inscrib'd from *Wright's Chard*, or *Loxodromick Tables*, found in some Books of Navigation; as those in *Newhouse*: Monsoons, or Trade-winds, and the Currents are best describ'd by the Ingenious Dr. *Halley* in the *Philosophical Transactions*, (where is a Map of them, as also in the *Atlas Geographicus*, and the last Edition of *Moll's Geography*) and by *Dampier* in the second *Vol.* of his *Travels*: The Constellations may be drawn by a Celestial Globe.

Your Projectures of the Heaven and Earth being compleatly finish'd, you may either apply them to a particular pair of Globes, or have them engrav'd in Copper Plates, from whence any Number may be taken off by a *Rolling-Press*, in order to make as many Globes as you please.

Having shewn how to project the Globical Papers, I shall (for the Satisfaction of such as may have a Curiosity to know how a Globe is made) shew how the Mechanical Part is perform'd.

The Body of the Globe, whereon the Globical Papers, or Gores of the Globe (as Artists call them) are apply'd, is compos'd of an *Axle-tree*, two Paper-Caps

few'd together, and a Composition of Plaister laid over them.

The *Axle-tree* is a piece of Wood which runs through the middle of the Globe, turn'd sometimes of an equal thickness, but oftner smaller in the middle than at the ends; where two pieces of thick harden'd Wire are struck in, call'd the *Axis*, that appear without the Globe, on which it turns within the brazen Meridian.

The Paper-Caps inclose this *Axle-tree*, and are made after the following manner.

You must have a Ball of Wood turn'd round, about a quarter of an Inch less in Diameter, than the size you intend to make your Globe of, with two pieces of Wire struck into it, diametrically opposite to each other, for Conveniency of turning in a Frame, which may be made of two pieces of Stick fixt upright in a Board, with Notches on the top to lay the Wire in. Round this you must paste waste Paper, both Brown and White, till you judge it to be of the thickness of Paste-board, and before it be quite dry cut it in the middle, that it may come off in two Hemispheres: To prevent the Paper from sticking, let the Ball at first making be thick painted, and every time
before

before you paste Paper on it, grease or oil it a little.

The Holes at the tops of the Caps occasion'd by the *Axis* on which the Ball turn'd, are very convenient for the *Axis* of the Globe to come thro' in covering it. Then having fasten'd the top of the Caps with small Nails to each end of the Wooden *Axle-tree*, sow them close together in the middle with strong Twine.

That the Caps may meet exactly, observe two Things: 1st, That the *Axle-tree* be just the Diameter of the Ball. 2^{dly}, That before you take the Caps off the Ball, you make Scores a-crofs the parting all round, about an Inch asunder, whereby to bore the Holes for sewing them even together, and leave a Mark to direct how to join them again in the same Points: For Instance, make a Cross over any one of the Scores in the upper Cap, and another Cross upon the same Score in the under Cap, and when you close them bring the two Stars together, by which Means, the Caps in sewing will come as close together as before they were parted. This Care must be taken that there may be no Openings between; in which Case, Paper must be cram'd in to stop up the Gaps: But whether there be any Gaps or no, there must be Paper pasted all over the

the sewing, to prevent any of the Plaister from falling in.

The Plaister is made of Glue, dissolv'd over the Fire in Water, and Whitening mixt up thick, with some Hemp shred small, the Use of which is to bind it, and keep the Plaister from cracking; as Hair is put into Mortar for the same End; a handful will serve two or three Gallons of Stuff. There is no Necessity for mixing the whole over the Fire, except the Whitening runs into Lumps not easily to be broken with the Hand.

For laying on this Plaister over the Caps in a Circular Form, you must have a Steel Semicircle, exactly half the Circumference of the given Globe, fix'd flat-ways in a level Table made for the Purpose, with a Notch at the end for the *Axis* (which must nicely fit it) to turn in, and a Button to cover it, to prevent the *Axis* from being forc'd out of the Notches, when the Globe is clog'd with the Plaister, and requires some Violence to turn it.

Then fixing your Paper Sphere within this Semicircle, lay on with your Hand the Plaister, turning the Globe easily round, till it be cover'd, so as to fill it: But before it comes to touch the Semicircle in all Parts, and be equally smooth all round, it will require a great many layings on of the

the Plaister, letting it dry between every such Application.

The second or third time of laying on Stuff it will begin to touch the Semicircle in some Parts, and to appear round ; the fourth time it will touch in more Parts, and look rounder ; 'till at last it will touch in all Parts, and become perfectly round and smooth, like a Ball of polish'd Marble.

Your next Business is to poise your Globe, for it generally happens, by reason of the Plaister lying thicker on one Part than another, that some side weighs still downwards. To remedy this, a Hole must be cut in that Part, and a convenient Quantity of Shot put in to bring it to a due Ballance with the rest ; after which the Place must be stop'd up with a Cork, and cover'd again with Plaister. The Bag that holds the Shot may be glu'd, or sew'd to the Cap within, or fasten'd to the Cork : Sometimes after one Part is ballanc'd, the Weight will incline to another, in which Case the same Remedy must be apply'd again, as often as there will be Necessity.

This done, by help of another Semicircle divided into 18 Parts, trace the Equator and Parallels of Latitude, placing a Black-lead Pencil at the Graduation

tion, and turning the Globe against the Point of it to make the Line. Then divide the Equator with a pair of Compasses into so many Parts as there are Globical Papers or Gores to lay on, and draw Lines through each, from Pole to Pole, by the side of the Semicircle.

Within each of these Spaces so mark'd out, you have only to lay one of the Gores, which (being cut out so exact, as neither to lap over, nor leave a Vacancy between one another) by the Assistance of the Lines, may be fitted, so as to fall in with each other with the greatest exactness; in applying the Gores, you may use a good binding Paste, but I prefer mouth Glue.

After this you may Paint and Varnish your Globes with common white Varnish at Pleasure, but this is best reserv'd for the finishing stroke, when the Globe is fixt within the Brazen Meridian and the Horizon.

Every one that has seen a Globe knows what the brazen Meridian and Horizon are, if not their Uses. The first you may have cast and graduated at the Mathematical Instrument makers; and in hanging the Globe within it, you are to take particular Care, that the Degrees thereof correspond to the Degrees of the first

first Meridian on the Globe. At the top fasten'd to it is the Horary Circle also of Brass, wherein the Hours of the Day and Night are Graved, the Index to which, is fixt upon the end of the Axis, whose Use you will find in learning the Use of the Globes.

The Horizon must be equidistant with the brazen Meridian from the Globe, that is, so far as the Globe may move smoothly, without touching or rubbing, and cut it at right Angles, exactly dividing the Globe into two Hemispheres, so that when the Pole is in the Zenith, the Horizon may exactly cover all Parts of the Equator; for this End there are two Notches cut in the Frame of the Horizon, and another in the Pedestal, for Convenience of holding the Brazen Meridian, and rectifying the Globe to any Position. The Horizon contains several concentric Circles, the outmost is the 32 Winds, next the Days of the Month, according to the *Julian* Account; then the Festivals and Days of the Week, within which are the Days of the Month, according to the *Gregorian* Calender; next which is the Sign and Degree the Sun is in, against each Day throughout the Year; and on the innermost Edge is the amplitude Circle, all which are best drawn after another Horizon

rizon. To this add the Box and Needle, or Compass, which always stands upon the Pedestal, to be ready for Use.

We must not also forget the Quadrant of Altitude, and the Semicircle of Position. The first is a thin, pliable piece of Brass, whereon must be graduated 90 Degrees answerable to those of the Equator, a fourth part of which it represents; with a Nut and Screw, to fasten it to any part of the brazen Meridian, as Occasion requires.

The Semicircle of Position is a narrow Plate of Brass, inscrib'd with 180 Degrees, and answerable to just half the Equator.



A N
APPENDIX.

Wherein the Present State of

GEOGRAPHY is consider'd:

Being A

Seasonable ENQUIRY

INTO

MAPS,

BOOKS OF

GEOGRAPHY,

AND

TRAVEL.

Intermix'd with necessary Cautions, Helps, and
Directions for future MAP Makers, *Geogra-*
phers and *Travellers*.

APPENDIX

TO THE HISTORY OF THE

INDIAN NATIONS

IN

THE NORTH AMERICAN

CONTINENT

AND

TO THE

GEOGRAPHY

AND

TRAVEL

OF THE INDIAN NATIONS
IN THE NORTH AMERICAN
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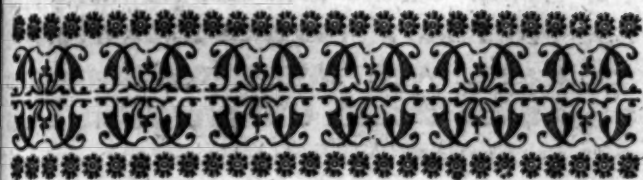
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C H A P. I.

Of the Value and Progress of Geography.

IF the Antiquity of a Science, or the Patronage of Great Men be any Proof of the Value of it, then surely none has a better Title to the Esteem of the Curious, than Geography. The Footsteps we find of it in the Sacred Writings are sufficient to confirm the Antiquity of it; not to mention what Authors say further upon that Head: Nor is there any Study wherein Princes have concern'd themselves more than Geography. 'Tis reported, that *Pharaoh Neco* (King of *Egypt*) commanded the *Phenicians* (famous for *Navigation* in those Days) to search out the Bounds of *Africa*, three Years successively. They were also order'd by *Darius*, King of *Persia*, to make Discoveries in the *Ethiopick* Sea, and the Mouth of the River *Indus*: And about the Year of CHRIST 100,

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the *Roman* Senate sent Geographers, and Surveyors into all the then known Parts of the Earth, with Instructions to measure the whole; though that great Design was not accomplish'd.

Alexander (in his *Asiatick* Expedition) took along with him *Diogetus* and *Beto*, two Surveyors: Others relate, that he took *Calisthenes* with him to *Babylon*, to make a MAP of his Conquests: And it is observ'd, That the *Romans* never went abroad to enlarge their Empire, but they took Surveyors with them for the same Purpose. Thus the Wars, though fatal to almost all other Arts and Sciences, have still been assisting to Geography.

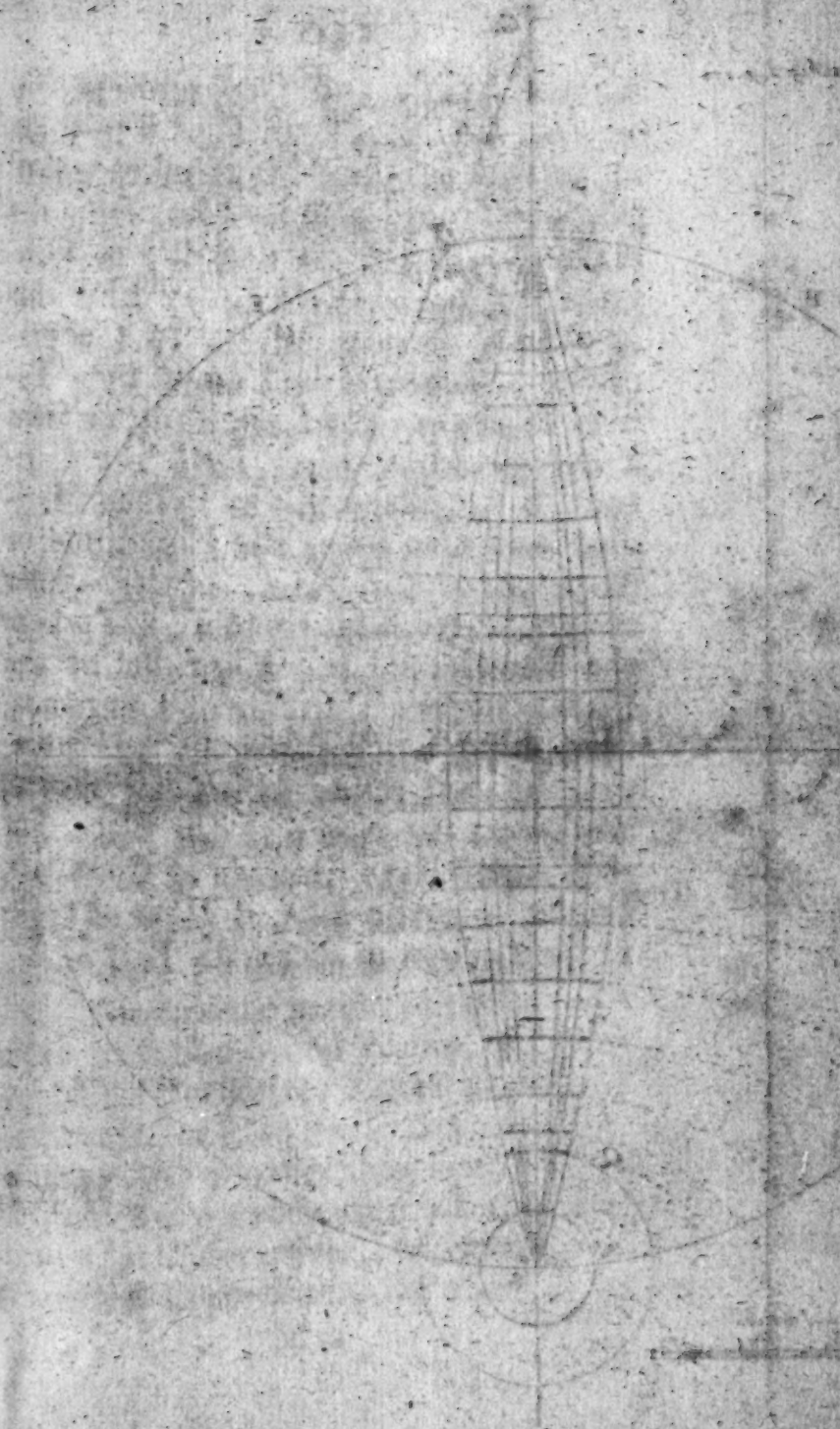
But as a greater Confirmation of the Value of it, we find amongst the Geographers, *Abulfeda*, Prince of *Hamah*, and *Ulugg Begg* a *Persian* Prince, not to mention *Hæthou*, who was Brother to the King of *Armenia*: I might add, that it is well known, the Itinerary of *Antoninus*, is by many, attributed to *Antoninus* the Emperor. And surely that Science must be more than ordinary in Esteem, when Princes themselves did not disdain to be ranked among the Professors of it. But what is to be lamented, the modern Professors have render'd it as contemptible, as those Great Men made it before Illustrious.

Geography,

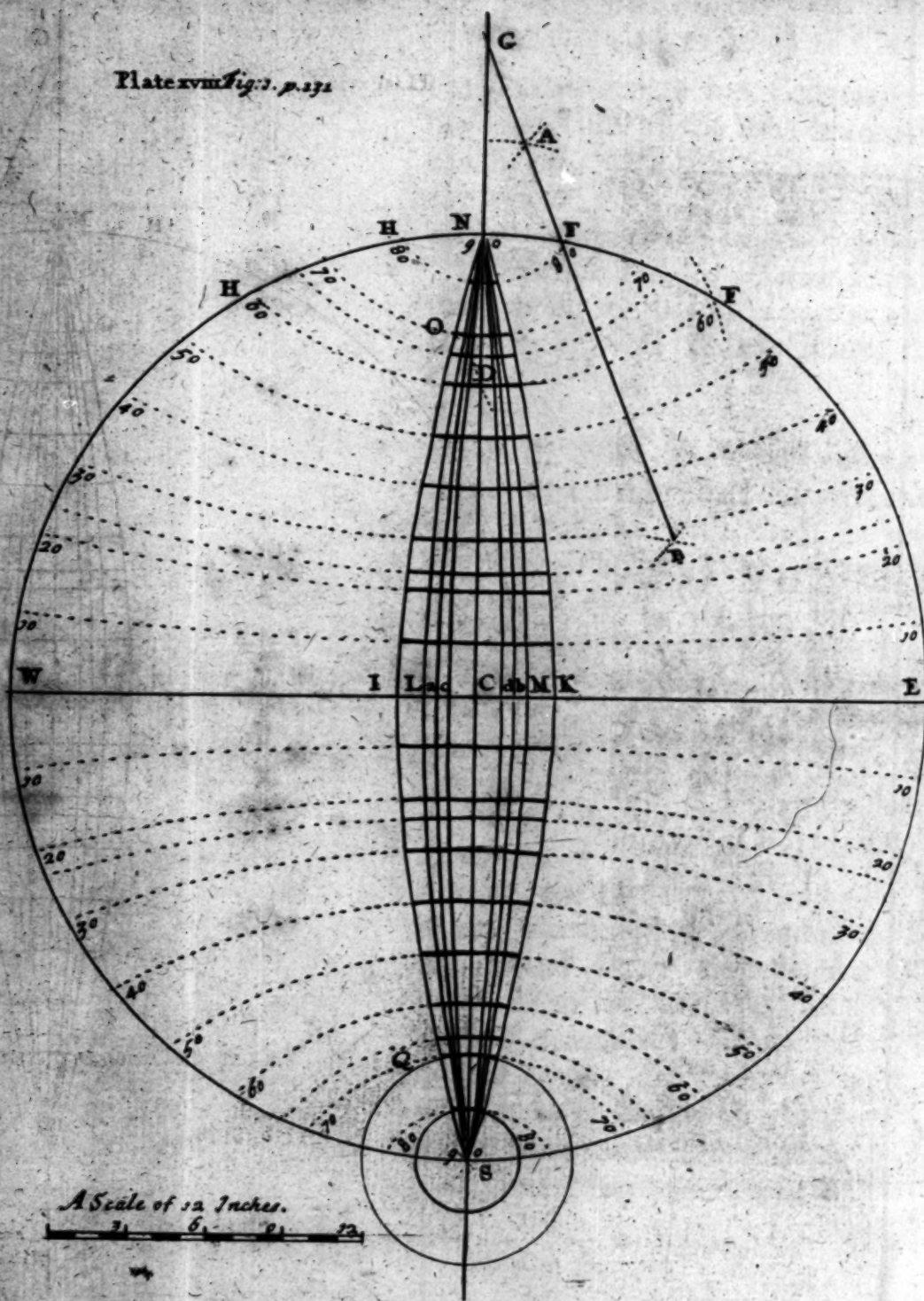
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Platexviii Fig. 1. p. 171



A Scale of 12 Inches.

3 6 9 12

Geography, without Doubt, flourish'd long before *Ptolemy*, for (not to mention *Strabo*, *Pliny*, *Mela*, &c. who were earlier) those MAPS which go under his Name, according to his own Confession, were copy'd from others, that were made by *Marinus Tyrus*, &c. with some Improvements of his own added. After him came those call'd the lesser Geographers; but from that time forward Geography lay dead, 'till about the fourteenth Age, that *Columbus*, by his Example, set the whole World a Travelling, and reviv'd in all Sorts of People a Passion for Geographical Studies. *Mercator* was the first of Note, and next to him *Ortelius*, that undertook to make a New Sett of MAPS, with the modern Divisions of Countries, and Names of Places; for want of which, *Ptolemy's* were grown almost useless. The Ice being broke, many follow'd his Example, and set forth MAPS, which were for the most Part, Copys of his. Towards the middle of the last Age, *Blaeu* in *Holland*, and *Sanfon* in *France*, publish'd New Setts of MAPS, with many Improvements from the Travellers of those Times: And whether they were thought so perfect as not to be mended, they have been copy'd ever since, with very little Variation for the better, but often for the

worse, by the *English, Dutch, and French* Map-makers. Geography was just relapsing into the former Obscurity and Error out of which *Nercator* took it, when *Monsieur De Lisle*, a *French* Geographer, undertook to disabuse the World, and put a Stop to those spurious Draughts that were daily obtruded on the Publick, by making a compleat Sett of MAPS, both of Old and New Geography, corrected and improv'd from the Surveys several *European* Nations had made of their respective Countries, the Observations of the best Travellers in all Languages, and the Journals of the Royal Societies of *London* and *Paris*: By which Performance, that Author, has in a most extraordinary manner obliged the Curious, and gain'd Credit and Applause to himself and his Country.

Notwithstanding, the Map-makers still continue to impose Copies from the Old MAPS upon the World, to the Dishonour, as well as Prejudice of Geography. The Design therefore of the ensuing Treatise, is to admonish our Map-makers of these Abuses, and to endeavour a Reformation in Geography, by inciting Travellers and Geographers to Care and Diligence in making and collecting their Geographical Observations.



C H A P. II.

Some Observations upon our Modern MAPS and Map-makers.

THE World has of late Years swarm'd with MAPS, and those with Errors. How well the MAPS of *Europe* have escap'd, I shall not say, but those of the other three Quarters were generally so false, that they cou'd no more be depended on, than the Travels of *Le Blank*, *Mendez Pinto*, or *Lisbgow*, from which they seem'd to have been made; there being very few to be found wherein one might trace any Road out of *Thevenot*, *Tavernier*, *Della Valle*, or any other Credible Author. And indeed it cou'd not well be expected otherwise, when the Publishers of such MAPS seem'd to understand their own Interest better than Geography, and took Pains more for their private Advantage,

than the Benefit of the Publick; whilst the Science daily suffer'd, and lost by one MAP the Improvements Ages had been gathering.

I do not blame our Geographers for Publishing faulty MAPS (for we may despair of seeing a truly Perfect one of any Country) but because they are not less faulty than they are; for tho' it can't be expected a MAP should be more exact, than the Discoveries of the Times will admit, yet it might be expected as exact and complete as those Discoveries would make it. And therefore it is, I think, the Geographers are to blame, who let Errors pass, which they might, with a little Pains, have Corrected; by which Neglect they put it in the Power of every one that reads Travels to find fault with them, and cause Geography, as well as themselves, to be run down.

'Tis no Excuse for one to say he copy'd his from another Map; because he never ought to copy that which he has not first examin'd, and found agreeable with the best Discoveries. The Truth is, every one that can copy or engrave a MAP, sets up for a Geographer, and having done that, thinks the Property is transferr'd, and accordingly calls himself the Author. But methinks, an Amanu-
ensis

ensis may as well call himself the Author of a Book. For my part, I have wondered to see some expose themselves so, as to write themselves Geographers to some MAPS, when 'tis plain, if they had understood what they profess'd, they never wou'd have Publish'd them. But we can expect no better, when Men that are capable decline the Task, and leave it to those to perform, who know little or nothing of the matter.

A MAP no sooner comes out beyond-Sea, but it is Re-printed by our Map-makers, tho' it contradict every thing of the kind before Publish'd, by themselves or others, and contain the most obvious Errors: This holds in Vogue among them, till another (perhaps quite different, and no less absur'd) comes out, which is in like manner espous'd and Copy'd, as if its being New was a sufficient Recommendation: Hence it is, that you rarely meet with two MAPS of the same place alike, tho' done both by the same Hand. The Figure and Situation of Places are altered as often as a New MAP is drawn, and Errors made, where perhaps there was nothing amiss before, insomuch, that the Newest is commonly the worst.

But MAPS are not always exact Copies of others, there are some which seem

to be patch'd up with a piece out of one, and a piece out of another, without any Judgment or Care: For the Map-maker often thinks himself oblig'd to make Alterations from others, that something New may appear in what he Publisheth; to this end, the Situation of Places is transpos'd, the Course of Rivers turn'd, the Bounds of Countrys, Provinces, and Coasts extended, or contracted in a very strange manner.

This will appear very plain to any that shall compare the MAPS (that were Publish'd before *De Lisles*, and many since) with the Travellers. In which, Places seem rather to be set down at Random, or to fill up Vacancies, than to express their Situations thereby. 'Tis well the Names don't alter ev'ry Day, or else one would be at a Loss to find the same Place in a New Correct MAP, and one of the same Parts made 100, or 50; nay, or but two or three Years ago, the difference of their Situations would so confound him. But if every Publisher of a MAP was oblig'd to cite his Author for ev'ry Alteration he made from others, the Productions of that kind wou'd be fewer, and more Correct.

'Tis observable, that not only the Sea Coasts, in two several Maps of the same Parts,

Parts commonly differ strangely from each other, but also, that rarely ever any agree in that respect with the Sea Charts, which happens for want of consulting the Wagoners, either thro' their little concern for Exactness, or imagining a MAP is to be drawn only by a MAP, and a Chart from a Chart.

I observe, that our MAP-makers make no Account of the Roads in MAPS, and therefore, some in copying from those that have the Roads omit them. Certainly such must have no Notion of the use they are in MAPS, otherwise they wou'd never deprive them of so essential a Part; for 'tis certain, without them a MAP is half imperfect. What can a Man learn from a multitude of Places, confusedly scatter'd? Like a Traveller in a Parthless Wood, he is at a loss which way to guide himself. Wou'd it not look very odd to see a Plan of *London* (if it can be so call'd) without the Streets? And yet it wou'd be equally Instructive, for it is as impossible to judge rightly of the Situation of Places in the MAP of a Country without the Roads, as it would of Churches, Palaces, and all other publick Buildings, in the Plan of a City, without the Streets.

The more Judicious Geographers have always taken care that their MAPS shou'd
not

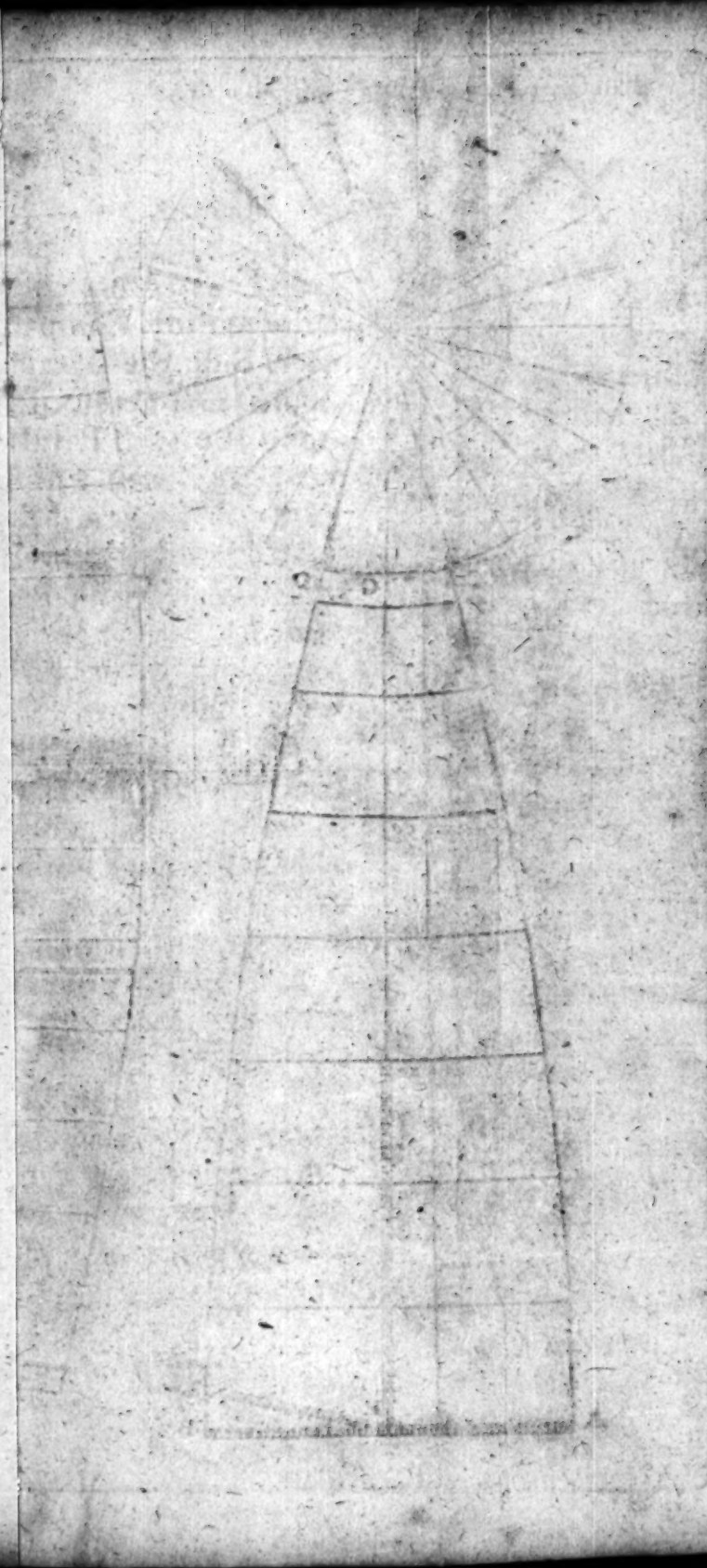
not want that necessary Improvement, adding often the computed Distances in Leagues or Miles between Places, according to the Measure of the respective Countries; and truly without that Addition, a MAP is still imperfect. For tho' tracing of the Roads shews the Communication that is between Places, yet without the Intervallary Numbers, there is no Judging what are the computed Distances, (which every one knows differ from the Geographical) or whether they be well accomodated together; in case they be not, as it often happens in Countrys that are too much extended, or contracted, I say, in such a Case, for want of the Intervallary Numbers, one wou'd be at a loss how to rectify them. But setting these things aside, 'tis requisite the Distances shou'd be exprest'd, if it were only because a Man does not always carry a pair of Compasses about him, and if he did, it wou'd give him a Trouble which might be sav'd by that means.

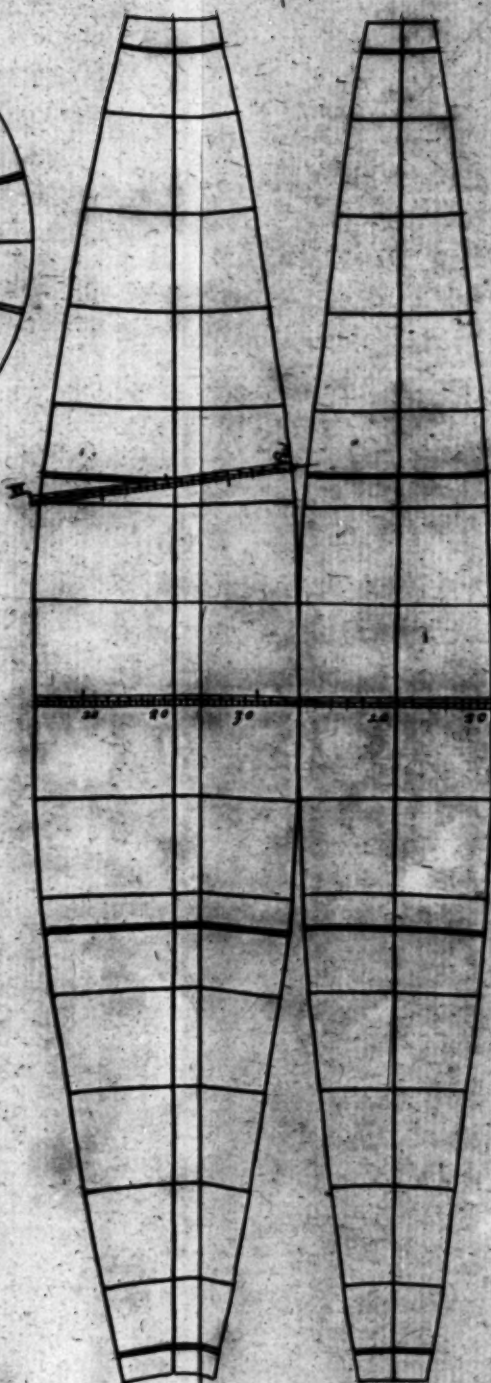
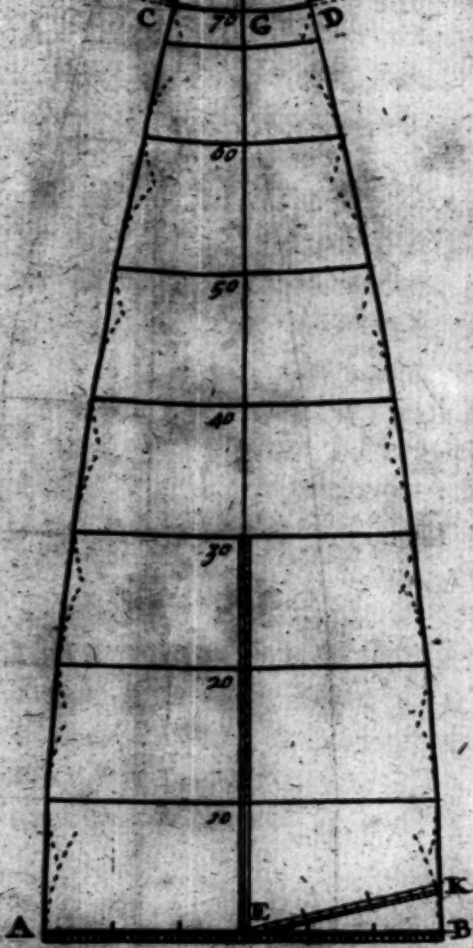
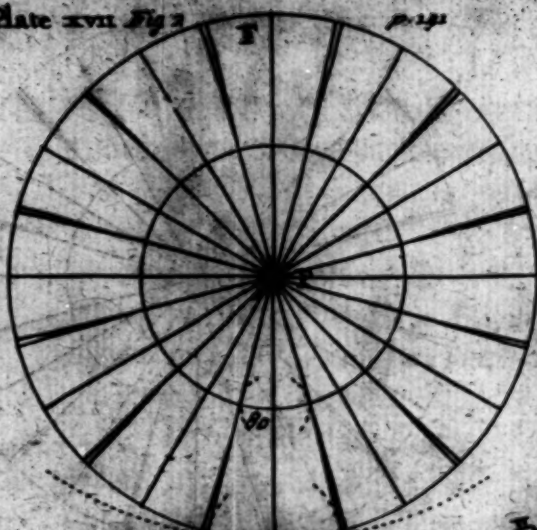
While these are the Methods our Geographers use to compose their Maps, 'tis no Wonder, the modern Discoveries and Observations of Travellers are neglected; and consequently, that MAPS abound with known Errors. The Latitude of *Constantinople* was found by Mr. *Greaves*,
above

above 60 Years ago, to be placed two Degrees more to the North in MAPS than it should be; which Observation was twice afterwards confirm'd by Mr. *Smyth* and Sir *George Wheeler*, above 40 Years since; notwithstanding which, the Geographers took no Notice of it, but follow'd the old Error, 'till very lately that it was corrected; though many continue it still. *Caramid*, *Amid* and *Diarbekir* are yet in several modern MAPS inserted as three distinct Cities, about 80 Miles asunder; Tho' *Thevenot*, above 50 Years ago, discover'd that Error in *Sanson's* MAPS, and found them but three different Names for the same City. He also finds Fault with *Sanson*, for placing *Orsa* on a great River, and making another fall into it from the same *Caramid*, and assures us, there is no such large River call'd *Tiritiri*, as he makes to pass by *Kengavir* and *Susa* in *Persia*, and falling into the Gulf of that Name: But the Geographers have been too indulgent to *Sanson*, at the Expence of their Credit, to mind *Thevenot*. To as little Purpose have other Travellers, both before and since, and in a more eminent manner, the *English* and *French* Royal Societies taken the Pains to communicate their Observations for the Help of Geographers, who don't the least regard them.

Besides

Besides these, I could enumerate many more Faults that overspread the newest of our MAPS: For Instance, 'tis common to find Towns misplac'd, some lying several Leagues from Rivers that ought to be upon them; as *Bir*, *Mosul*, &c. in *Mesopotamia*, *Zulfa* in *Armenia*, *Schiras* in *Persia*, *Agra* and *Holobas* in *Mogul's* Empire: Some on the wrong side of Rivers; as *Di-arbeck* in *Armenia*, *Tiflis* in *Georgia*, *Holobas* or *Praya*, and *Brampore* in *Mogul's* Country; or below the Confluence or Division of Rivers that should be above; as *Cairo* on the *Nile*, which River is still describ'd with 7 Mouths, and sometimes its Head plac'd below *Abyssinia*, as may be seen in a MAP newly publish'd. Some Places sever'd from the *Continent* by large Seas, that are not over two or three Leagues distant; as *Corea* and *Chusan* on the Coast of *China*. Islands at a small Distance from Land, posited many Leagues from it; as *Ormuz*, and the adjacent Isles in the *Persian Gulf*; *Bombay* on the Coast of *Decan* in the *East Indies*. *Peninsula's* sometimes joyn'd, sometimes divided by Seas from the *Continent*; as *California* in *America*, *Nova Zembla* in *Muscovy*, and *Corea* near *China*. *Straits* appearing whole Degrees over, that are not above 10 Miles wide; as the *Straits* of *Bab el Mandel*, *Ormuz*, *Rhodes*,





Rhodes; the *Straits of Constantinople* that are but $\frac{1}{4}$ of a Mile broad, are often made 20, 40 and 50 Miles in some MAPS: An oblong Figure from West to East is given to the *Caspian Sea*; in others from South to North, and a third represents it square. *Tartary*, in some MAPS, is extended almost to the 80th Parallel, in other, not above the 70th; in some all the East and North Coasts are left out; in some described of a round Form, in others of a square, and sometimes of an irregular Figure. A Coast shadowed strongly, as if thoroughly discover'd in one, shall be drawn with faint Lines in another, to shew 'tis uncertain, and in a third it appears to be absolutely unknown. Many supposititious Islands are introduc'd in some, and in others several remarkable Places left out: To say no more, I have found *Ispahan* wanting in a MAP of *Perfia*. If I was to enumerate all the gross Mistakes of this Nature that are obvious, I should go on to the end of the Chapter.

It was to be hop'd, upon the coming out of *De Lisle's* MAPS, that the Geographers, by following such exact Precedents, would have left no room for Objections of this Kind for the future; and that none of the old exploded Errors were to be found in their MAPS: But it is so far

far from that, that some have taken no more Notice of them, than if there were no such Things extant. Now what can be a greater Blemish to a Geographer's Character, than his copying erroneous MAPS, when he may have correct to follow? as if he did not know the Difference.

There is a MAP of the *Russian* Empire prefixt to the *Muscovite* Ambassador's Travels to *China*, printed 1706, which contains most of the premis'd Errors, and perhaps many more. I shall not dispute the Figure or Dimensions of *Tartary*, which are very different from other MAPS. *China* is strangely alter'd. *Pekin* is situate 8 Degrees within Land, that is not over one. The Island *Chusan*, but three Leagues from the *Continent*, is there put 60, and made eight times larger than it should be. *Corea* lies 30 Leagues from the *Continent*, and there is no Sign of the *Cang* Sea. The *Mogul's* Empire and *India* is as much too narrow from West to East, as it is extravagantly extended from South to North. *Cabul* is twice inserted seven Degrees asunder N. E. and S. W. *Bram-pore* is placed four Degrees nearer *Ganges* than it ought, three Degrees above its Latitude, and on a large River that is not found in other MAPS, or Travellers. The Sea Coasts are intirely false; it would be

be a Labour to tell in the Kingdoms of *Georgia*, *Armenia*, and the adjacent Countries, how much the Situation of Places is alter'd and confus'd. But to make the Uncorrectness of this MAP yet more appear, I shall compare it with *Olearius's* MAP of *Persia*, publish'd in his Travels above 60 Years ago, with Regard to those Places lying in the Road between *Ardebil* and *Ispahan*, whose Latitudes that curious Author has nicely observ'd.

The following TABLE shews the Latitude of ev'ry Place, with their Distances and Bearing from one another, according to each MAP.

	Lat.	Dist.	M.		Dist.	M.
	According to <i>Olearius</i> .				According to <i>Ides</i> .	
Ardebil,	38 5				36 15	
Miana,	37 8	67	E.S.E.		36 12	160 E.
Sangan,	36 48	65	E.S.E.		36 17	85 E.
Sultany,	36 30	15	S.E.byE.		37 4	50 N.E.
Cashin,	38 15	52	E.byS.		37 5	88 E.
Kashan,	33 51	167	S.S.E.		37 6	160 E.
Ispahan,	32 26	90	E.S.E.		34 27	285 S.W.

Ispahan is distant from *Ardebil*, in *Olearius's* MAP 420 Miles, in *Isbrand Ides* his MAP 320.

I should never have taken Notice of the Uncorrectness of this MAP (being satisfy'd it was never design'd by the Author

thor to give the Curious Satisfaction beyond *Tartary*, and to shew what Countrys border'd on it) if I did not see its greatest Absurdities copy'd by our Geographers in their MAPS and Globes: 'Tis indeed matter of Wonder how they could be so much overseen, as to let the last recited Errors pass the Press, considering the Road between *Ardebil* and *Tauris* is so well known, that the worst MAPS are generally pretty exact in that respect. This may suffice to prove that our Geographers still continue to Copy the Old exploded Errors, but I must own, I have so much Charity for them, as to believe they do it not willingly.

I cannot but take notice here also of a late Sett of Antient and Modern MAPS cry'd up by some, whose greatest Faults nevertheless are not the Gravers. I cou'd mention several Mistakes in them very visible (not to say gross) as the undue Decrease, or Inclination of the Degrees of Longitude, particularly in the MAPS of *Europe* and *France*. The disagreement between the two MAPS of *Asia*, the Emptiness of them in general, and in particular of *Africa*, if that great Caution in inserting Places across from the Incertainty of their exact Situation, the whole MAP, as well as many others, might have been left out, with-

without any great Loss to the Peruser. Forreigners may go on their own way, but I would put our Geographers in mind how much they diminish the *British* Fame of improving Arts and Learning, by neglecting one of the most delightful, and profitable of the Sciences.

If the MAPS of *Asia* be so erroneous as I have shewn, what must we expect from those of *Africa* and *America*, which are less known? Nay, the late Observations of the Longitude and Latitude of some of the principal Cities of *Europe*, and the Surveys of particular Nations of their own Countrys, have discover'd such numberless Errors in the MAPS of that Quarter, as it would be endless to recount them.

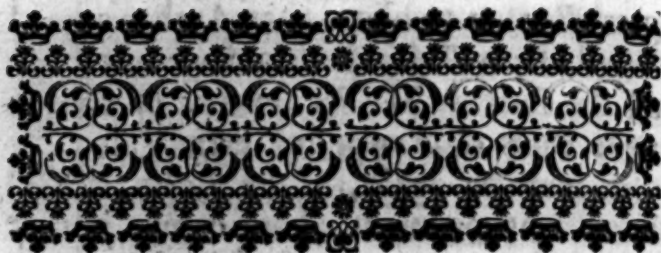
De Lisle in good time undertook the Correction of the MAPS; however, there are some Things in them which might have been amended. There are who find Fault with some of his Projections, particularly that of *Asia*; where, by reason that it is drawn according to the Polar Method, (whereby the Equinoctial becomes Circular, which should be a strait Line) the Degrees of Longitude in all the Parallels South of the Equator, are greater than those on the Equator, and those on the Equator less than the Degrees of La-
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titude,

titude, with which they should be equal. Another Objection is, That in different MAPS the same Places have different Figures and Situations. Some accuse him with inserting many Things in his MAPS upon no better Ground than Hear-say, particularly the New *Philippine* Isles, which they conclude to be fictitious, because *Dampier* could find no such in his Voyage that way round the World. Whether this Accusation be true or false, it shews the Necessity of an Author's producing his Authority for ev'ry thing he inserts, wherein he differs from others: Indeed some Parts of *Persia* and *Tartary*, which I suppose were drawn from the *Persian* Tables of Longitude and Latitude, might yet be corrected out of the *Nubian* Geographer and others: And I am of Opinion, he should have follow'd *Isbrand Ides* thro' *Tartary*, so far as he travell'd himself, who informs us in (I think) the last Chapter of his Travels, that he took the Altitude of the principal Places as he pass'd along. But where so many Errors were to be corrected, and so many Volumes to be consulted, 'twas hardly possible but that some should be overlook'd; in short, considering the Difficulties he had to struggle with, 'tis very well that he hath brought the MAPS to the Perfection they are.

I must own, the MAP-makers have no great Reason to allow that Author a good Word, because his Performance has made all the former MAPS (except of two or three Parts of *Europe*) of little Value.

It may be ask'd, if *De Lisle's* MAPS be an Improvement, how comes it that many of them are not so full of Places as former MAPS? The Reason is, doubtless, because he was cautious of inserting any Place whose Situation was altogether uncertain; And indeed I believe it would be a hard Matter for the MAP-makers to produce their Authority for the Position of abundance of Places which we find in their MAPS.





C H A P. III.

*Advice to MAP-makers, with some
Directions for making Correct
M A P S.*



Geographer or MAP-maker should understand the Science very well; and be perfectly acquainted with the Travellers into all Parts of the World: For how ridiculous a Thing is it, without Geography, to set up for a Geographer?

In the next Place, a M A P-maker should not take every MAP that comes out, upon Trust, or conclude that the newest is still the best, but ought to be at the Pains to examine them by the Observations of the best Travellers, that so he may know their Goodness or Defects, and

where

where he finds an Error, correct it in his own : But this not without producing his Authority for every such Alteration in some corner of the MAP; and indeed every Alteration should be look'd upon as an Imposition, that was not so confirm'd, because all Copiers are for altering, to make a shew, as if they had corrected or improv'd the Original.

It is to be fear'd, our MAP-makers have seldom any Interest in View but their own, which may be one Cause why their MAPS are copy'd from the Old, and without Care; tho' if they rightly consider'd, the Publick Advantage is their private, and where they now sell one MAP, they would sell many, if they were correct; for then they would be bought by those that delight in them, for Use, as well as Ornament.

'Tis a vain Singularity which MAP-makers affect, of making use of various Meridians; one reckons Longitude from the Meridian of *Corvo*, another from *Teneriff*, a third from *Ferro*, *London*, &c. Nay, one won't serve some, but they must have two or three, and very often the Peruser is at a Loss to know from whence Longitude is computed, for want of having it remark'd in the MAP. Is it not as easy for our Geographers, (I am sure it is bet-

ter) to fix upon one certain Meridian among themselves, from whence Longitude should always be computed? As for Instance, let the Meridian of *London* be the first Meridian, which is fittest, because it is more satisfactory to a *Britain* to know the Distance of all Places from his own Country, than from another: And the Question is, How far is such a Place from *London*, not from *Teneriff*, or *Ferro*, of which one cannot have so good an *Idea*, if any at all. If this Case was once adjusted, the Difference of MAPS from one another, and their Errors would much easier appear.

A M A P-maker should take Care, as often as he draws a M A P of the same Country, whether larger or smaller, whether in whole or in Part, that he never alters the Situation of Places with respect to Longitude and Latitude; and that so much of the bordering Countries as come within the Paper, have the same Situation as in their proper MAPS. For Instance, the Bounds between *Germany* and *France* should intersect the same Degrees and Minutes of Longitude and Latitude, in the particular MAP of each Country; and so much of *France* as would come within the MAP of *Germany*, should have the same Situation in all Respects, as in its particu-
lar

lar MAP. This would be easily done, if the Geographer took Pains but to adjust the Extent and Limits of Countries to their due Longitudes and Latitudes, drawing large MAPS of each Country, containing the minutest Remarks of Travellers; from whence MAPS of any Size might be projected, by disposing Places in the Copy according to the Longitude and Latitude in the Original; to which end it would be very necessary to have Tables of all Places, whose Longitude and Latitude have been found by Observation, because they might be inserted from thence to a much greater Exactness, than from a MAP of the largest Scale.

The marking out the Roads is indispensably requisite in MAPS, without which, a Geographer can never make them of much Use to either a Traveller or Student; all Things appear in Confusion, and the Eye wanders as in the Dark, without knowing where to go: Whereas 'tis a Pleasure, as well as Advantage, to trace the Way from one Place to another, and to know the several Roads betwixt any two remarkable Cities, and the Towns by which they pass. Besides, they are of the greatest Use imaginable in correcting the MAPS, and keeping them from being corrupted by Copiers; for having

the Roads, shews that Care was taken in laying down Places, and is a Restraint to the Copier, who is compell'd by that Means to follow the President closer, than if Places were dispos'd without Method. Tho' some, to the end that the Erroneousness of the Alterations they have made might not be so easily perceiv'd, have left out the Roads in their Copies.

Roads in MAPS are necessary to shew the Communication between Places; nor can a MAP be call'd a true Representation of a Country without them, because it supposes no Roads therein. By help of the Roads Places are laid down regularly, and having the Latitude of two remarkable Cities, the Geographer, by taking Care, may lay either of them down near its true Longitude, in respect of the other: But in Case their Latitudes be not known, yet their Position, and that of the intervening Places will be pretty exact, with respect to Distance.

But the Roads loose abundance of their Use, if the Distances of Places be not express'd by Figures, as is already intimated in the last Chapter; besides, without it there is no judging whether Places be laid down with Care or no: If the MAP be well perform'd, 'tis for the Geographer's Credit to insert the Distances, by which the

the Correctness of his Work may be try'd. He should give every Body that Satisfaction, for none is oblig'd to stand to his Determination in asserting the Situation of Places. The MAPS are capable of vast Improvements, and every new Discovery detects some Fault, in that which before was thought could hardly be amended.

Roads with the Distances are of so great Importance in MAPS, that should the Journals from whence they were drawn happen to be lost, something of them would by that Means be preserv'd, and some Use might be made of them in another Age. If *Ptolemy* had observ'd this Method, his MAPS would have been abundantly more useful, and we might have been able not only to rectify them, but to improve the Modern thereby; for it would have led us with some Certainty to the Discovery of the ancient Names of Places, and prevented much Confusion and Doubt which arises in Geography upon that Occasion.

In MAPS of Parts remote, and but little known to us, 'tis requisite with the Distances to insert the Author from whence they were taken, as in *Fig. 12*, for the greater Confirmation of their Exactness, and a Reference to, or Quotation from such a MAP, would be as valid as from the Book it self.

I shall only add further, with regard to Roads and the Distances, that a MAP, be it ever so correct, comes out with very little Advantage or Authority above the worst, without that necessary Qualification, because every one is not capable of distinguishing, or has not the Books to examine them by.

The Plans and Prospects of Cities which are sometimes set about MAPS, are very useful, as well as ornamental. A certain (a) Author speaking of the Usefulness of MAPS, very well observes, That the Eye will learn more in one Hour by Observation, than the Ear will benefit in a Day by Discourse. Is it possible for all the Words in the World to give such an *Idea* of St. Paul's as the Draught of it? One may describe a Place from the Prospect, but it is impossible to draw a Prospect from the Description. In short, a Draught shews at once what many Words can't express, and the best one can have is but a confus'd *Idea* without it.

(a) Fuller's
Pisgah Sight,
p. 3.

In like manner, if there be any particular Survey of a Harbour or Coast, 'twill be very convenient to insert it; but especially the Latitude and Longitude of all Places that have been taken by Celestial
Obser,

Observation, that the Reader, by knowing those Places whose Situations are determin'd, may the better judge of the Correctness of the rest, and the Copier caution'd not to alter what can't be amended. This would be very effectual in preventing the Corruption of MAPS.

'Tis in the Geographer's Power to make his MAP very entertaining to the Curious, and by delineating the Natives at their Sports or Devotion, their King in State; the various Fruits, Beasts, Fowls, and the like, instead of other Flourishes, give us at one View, as in a Picture, both the Geography and History of a Country.

A Geographer should never insert any Place, the Situation of which is uncertain, or whose Distance from some remarkable Town is not observ'd by some Author; 'twere better a MAP were empty of Names than fill'd after this Manner. He that would write or draw MAPS of *Asia* and *Africa*, can do neither well without consulting the Ancients, for he will often find they help where the Moderns fail. We have not the same Opportunity of being acquainted with most of the Oriental Countries, as the *Romans*, who had all those Parts under their Dominions which are now possess'd by the *Barbarians*, among whom it is unsafe Travelling;
and

and that is the reason that the antient MAPS and Geographys, with respect to some Parts of *Asia* and *Africa*, give an Account of a greater Number of Places than the Modern.

A Geographer should take particular Care that his Projection be drawn true, for let Places be set down ever so exact with respect to Longitude and Latitude, yet if the Meridians and Parallels be not rightly projected, 'tis all wrong, and will be out in the true Dimensions, Bearing and Distance. As to the Projection it self, 'tis not much matter after what Method general ones are drawn, from which little more can be expected, than to shew in what manner many Kingdoms lie together; their Figure, Bounds, and the like: Only observe this Caution, not to make use of the Polar Projection, if the Portion extend beyond the Equator. But particularly MAPS, especially if they contain not over 10 or 20 Degrees of Latitude, are best drawn by the Method describ'd, Part I. Chap. 18. for making MAPS which is not subject to those ill Effects that others are.

I am very sensible that such a Collection of Travels as a Geographer should be master of, would be very chargeable, and that many are not to be met with
but

but in private Librarys ; for which reason, some that have the Inclination to take Pains, want the Conveniencies, and others that have endeavour'd well have fail'd : Therefore I propose in some Time, for the Benefit of Geographers and Students in the Science, as well as Travellers, to publish a Book of all the known Roads into the several Parts of *Asia*, *Africa* and *America*, with proper MAPS adapted to them, according to the Method I have here recommended ; being a Collection of the Journals of several Hundred Travellers out of diverse Languages.



CHAP.



C H A P. IV.

*Remarks upon our Modern BOOKS
of Geography, shewing wherein
they are principally defective.*



IF we were to judge of the Antient Geography by the Modern, certainly we have little or nothing of it transmitted to us, in Comparison of what was known to the Antients. Our Books of Geography, like the MAPS, are in general very defective; and in the most compleat, the Business of Geography is not pursu'd as it ought to be; they being more properly Historical, than Geographical Descriptions. Besides, those few Geographical Remarks they do contain are rarely taken from the Travellers, but for the most Part borrow'd from one another,

other, or taken from the MAPS. A Thing very odd ; as if the MAPS were more to be depended upon than the Observations from which they were, or should have been made. Were the Travels lost, how would Geography be preserv'd and transmitted to Posterity ? The MAPS are generally false, and our Geographers contain only a few Observations taken from them.

We frequently find the later Geographers quoting the old for the Dimension of a Country, telling us how broad *Cluverius* and *Heylin* makes it, but to what Purpose I know not. Did they actually measure it, that such Stress is laid upon their Authority ? No, they had no better Helps than the MAPS of their Times, which were altogether erroneous : And where is the Benefit of knowing the wrong Dimensions of a Place ?

You have also the Divisions of a Country given, according to several Authors, as *Sanfon*, *Luits*, &c. but what is it to the Reader what they give, if they don't shew their Authority ? 'Tis the Travellers should be consulted in that Point, and that which appears most exact follow'd. A certain Author writes, that *Sweden* is 15 Days Travel on Horseback in Breadth. *Boban's* Geography dictates, What can any one understand by that ? since the Rate of
the

the Horſe's Travelling is not obſerv'd, the Reader is as wiſe as ever he was.

In like manner, 'tis common in the Deſcription of a City or Town to give the Longitude and Latitude according to two, three, or four ſeveral Geographers; as *Sanſon, Bleau, De Wit, Moll*, without intimating which ſeems to them moſt exact. How then ſhall the Reader judge? Why, by being at the Pains, which the Geographer ſhould have been at, of conſulting the Travellers, to ſatisfy himſelf. But methinks that Author writes to little Purpoſe, whoſe Readers are to ſeek as much as they were before.

Nay, what is ſtill odder, where the Latitude or Longitude has been determin'd by Obſervation, you will find different Calculations of other Authors (that could be taken only from ſome MAPS or Tables) inſerted likewise, as if they were themſelves uncertain, which was moſt to be depended on; or imagin'd that every one who made MAPS or Geographical Tables, had themſelves obſerv'd the Longitude and Latitude of all the Places they ſet down, and ſo muſt be of equal Authority, the Reader being ſtill left to find out which is the Right.

By this Means the Geographys ſeldom or never agree with any one particular
Sett

e it of MAPS, even with those that belong to them, except *Morden's*, who, I think, is the only *English* Geographer extant that hath made MAPS to his Book, and adapted it peculiarly to them: For now a-Days it seems that a MAP-maker's Business is one thing, and a Geographer's is another.

The Modern Geography being so ill handled, what must we expect of the Antient? which for want of either Skill or Care, or both, in the Collector, is generally very confus'd and imperfect: The Truth is, they seldom take the Trouble to go to the Authors themselves, but borrow from the Abstracts of others. It must be confess'd, 'tis no less difficult to reconcile the Antient Geographers with themselves, than with the Modern; they differ often so much in the Names and Situations of Places. Of many thousand Places mention'd by *Ptolemy*, very few have the same Names given to them by *Strabo*, and other Authors; the Reason might be, that as often as the Government chang'd the Names and Limits of Provinces, and Cities were chang'd likewise, and then the Geographers took care only to mention the Names that were in'use, at the time they wrote.

Observe, that there is no depending on the Latitude and Longitude of Places given

ven by the Antient Geographers: As for Instance, *Ptolemy* is not to be rely'd on for the Latitude of any Place beyond *Alexandria*, where he liv'd, and which Mr. *Greaves* found to be given by him pretty exact, as is plain from his placing *Byzantium* (or *Constantinople*) above two Degrees more Northward than it ought to be, and consequently the agreeableness of the Situation of an Antient to a Modern Town, with respect to Latitude, or often distance from some other known Place, is no Rule to conclude them to be the same; nor are we altogether to depend on the Antients Accounts of the Head or Course of Rivers, they differ so (as *Pliny* and *Strabo* about the *Euphrates*) any more than on the Modern.

As to the Historical Part of our Geography, the later us'd to be taken from the older, or translated from Forreigners, whereby we were serv'd up with absolute Accounts of above 100, or 200 Years standing, instead of New. *Morden* and *Gorden* being (I think) the only two that took Pains enough to extract their Observations from the Modern Travellers, before the last Edition of *Moll* and *Heylin*; for I must allow, some of the Modern Accounts have the Advantage of the Old, with respect to the History, if not to the Geography.

Our

Our Books of this kind have still some Defect in the main. Some that are large enough want Method, and some that have Method are too short; Others again want both Method and Proportion, being either too big, or too small.

Eachard's Geography is a very judicious, methodical Piece for a *Compendium*, and agrees very well with *De Wit's* MAPS, to which it is adapted. I wish I could say so much in Praise of a Book call'd, *A short way to know the World*; One half of the Geography of *Asia*, *Africa* and *America*, is taken up with Questions, and the rest is jejune and dry.

Morden's will serve to give one a pretty good Notion of the Modern Geography and History of Countries.

Gorden's Geography would be a compleat Piece, if the Topography was added.

The *Atlas Geographicus* is the World in *Chaos*; there are very good Materials, but they want a Form: And what is very incongruous, there are many supplemental Descriptions of Things and Places, that are much larger than the Accounts that are given first of them; which however, I impute to the Author's being obliged to precipitate its Publication, that a Portion of it might come out Monthly.

Heylin has receiv'd little Improvement in either the Method, the Geography, or the History, except the Chronology from the late Edition; however, it is in it self a very valuable Book.

But that which goes by the Name of *Moll's* Geography, is the most perfect Piece that has been writ yet in any Language, and yet it might be much improv'd; so that for all the World abounds with Books of Geography, yet a compleat one is still wanting.

I must not omit taking Notice of one great Fault in Geographys, *viz.* that the Topography and History of *Asia*, *Africa* and *America*, is seldom proportion'd to that of *Europe*, and what we want most to know, they take less Care to inform us in. I know it will be objected, that those Quarters are not so thoroughly known. But is not that an Argument why the Geographers should be the more particular? Instead of that they are very careful to give the Topography of *Europe* compleat, while they omit several remarkable Places in the other three Quarters, and describe others slightly, tho' they don't want exact Accounts of them in Travellers, if they pleas'd to consult them.



C H A P. V.

Advice to Geographers, with Directions for rectifying Geographical Systems and Dictionaries.

IS a Folly for any Man to pretend to write the Geography of a Country with any Accurateness, without having first of all taken the Pains to draw a MAP thereof from the Observations of the best Travellers, except he can find one made to his Hand conformable to them, it being indispensably necessary for the Geography to agree with the MAPS belonging to it: For how absurd a thing is it to see them contradict one another, or for the Geography to agree with no particular Sett? which is the Case of many of them.

From these MAPS so made, the Dimensions of the Countrys, and the Latitude and Longitude of all Places that have not been determin'd by Observation should be taken, and from no other MAP or Geography: For what has the Reader to do with *Claverius's* wrong Dimensions, or any Situation but the right? which only incumber and confound the History.

Where the Latitude is found to be observ'd by *Olearius*, *De la Valle*, or any other Author whose Calculations may be depended upon, (for many give the Latitude and Longitude of Places, but few have observ'd them;) no other ought to be inserted, except it appear to be an Observation also.

A Geographer should be very exact in giving a Description of his MAP, for as a MAP is (or should be) the true Representation of a Country in a Geographical Figure or Draught, so the Geography (abstractedly taken) is only to describe that MAP after an exact and methodical manner.

A Geographer can never make his Book (any more than a MAP) useful to a Traveller without describing the Roads, so far as known thro' each Country; Nor is there any other way of transmitting the Geography of one Age entire to another;

other, or so as it may be of considerable Use to Posterity. If *Ptolemy* had taken this Method instead of that he chose, he had not left the Geography of his Time so obscure. And what should we do if we had nothing left of the Geography of *Africa* and *Asia*, particularly *Tartary*, but Tables of Longitude and Latitude made from some of *Mercator's*, or *Sanfon's* old M A P S, for we would have been oblig'd to take the Situation of Places just as they had dispos'd them, without being able to set them right for want of the Journals.

In composing the Work no Remark should be inserted without citing the Author, to the end, that the Reader may the better judge of the Geographer's Pains, and what Credit is to be given to every thing that is related.

But this is not all; for it is an easy thing, having Books before one, to make Collections out of them: But it is all lost Labour if it ben't done with Judgment, and in Method, for that is the Soul of a Work of this Nature, which should be uniform and regular, like the World which it describes.

'Tis impossible to write well upon this Subject without reducing your Matter into Heads; such as the ingenious Mr. *Eachard*

has set down in his exact *Compendium*; under each of which it is requisite to reduce all that every Author, both Antient and Modern, has writ to the purpose: For Instance,

In describing the Bounds and Divisions of a Country; first you are to shew what they were in antient Times, as given by *Strabo*, *Ptolemy*, &c. after which you are to give the later Divisions under the several Revolutions and Changes of State down to the present, as far as may be collected from the several Travellers that have writ at different Times.

Under the Head, which comprises the Roads, must be introduc'd the Distances only of Places from one another, out of Authors, not omitting one that has observed any thing of the kind, or the least Remark to be found in them, that may any way serve to confirm or illustrate their Situation.

In the Description of each City and Town must also be collected all, or what is most material, out of the antient and modern Authors. The same Method must be observ'd with respect to Rivers, Lakes, Mountains, the Manners and Customs of the Inhabitants, &c. under their proper Heads, according to the Method prescrib'd hereafter in collecting Travels,

How.

However, the Geographer, to avoid being too Voluminous, may deal with the History, he should be careful in the Description of each Part to introduce all the Mathematical Observations to be found dispers'd in the several Books of Travel relating thereto ; in order to give the Reader at one View a Prospect of the Discoveries, and Improvements that have been at any time made. In a Word, a compleat Geography should contain all those Observations which are needful in making and correcting the MAPS, without which it can't properly be call'd a System of Geography, tho' ever so compleat, with respect to the History.

But it seems in this I don't agree with our Geographers, who are more solicitous in composing the Historical, than the Geographical Part. But herein they differ widely from the Antients, who appear by their Writings to have set much the greater Value upon the Geography, as that Part which they conceiv'd would be most useful to Posterity.

Ptolemy, tho' he did not collect the Geography of his Time according to the Modern Method, yet made use of an Expedient that shew'd his Desire of transmitting it to Posterity, by reducing all the Cities, Towns, Heads of Rivers, Bays, Promon-

Promontorys, Mountains, &c. of each Country, into Tables of Longitude and Latitude, contenting himself with naming Places and People, adding very little of their History or Description.

The lesser *Greek* Geographers the Itinerary of *Antoninus* and the *Peutingerian* Tables, though imperfect, are yet further Testimonies of the superiour Esteem the Antients had of Geography, and how useful they conceiv'd it would be to their Posterity, to leave them Journals of Travels perform'd in their Times; and whosoever will only look into the *Persian* and *Arabian* Geographers, will find they have been more intent to describe the Earth, than its Inhabitants, particularly the *Nubian* Geographer, which contains very little besides the Divisions of Countries and the Roads belonging to them; a very valuable Work, and of great Use to those that would draw MAPS, or write well of the Old World, especially *Asia* and *Africa*.

But to come nearer Home, how industrious were the first Voyagers into the *East* and *West Indies*, to discover, as well the Inland Parts as the Coasts, to the end they might communicate to the Publick, at their Return, exact Journals of their Travels? Whensoever they fail'd of so doing, the Curious at Home did not spare
to

to censure them. Thus we find *Ramusius* (a) blaming the *Spaniards* for compiling large Volumes of the Conquests and natural History of the *Indies*, while the Geographical Part was neglected by them.

^a Preface to
the 3d Vol. of
Coll. Travels.

But to prove this Point, I need only have instanc'd how industrious the Learned have been to adjust the Modern to the Antient Geography, and fond of making Discoveries that way. *Minadoi*, an *Italian* Author, has writ a particular Treatise to prove *Tauris* in *Persia* to be the Antient *Ecbatana*, and *Monsieur Casini*, a famous *French* Astronomer, another, to prove the *Maldivé* Islands to be the *Taprobana* of *Ptolemy*, with many more.

This is all I need say upon this Head, because the ingenious Mr. *Eachard*, in the Appendix to his *Compendium*, has given Rules and Directions for making a compleat Body of Antient and Modern Geography; but before I conclude, it will not be out of the way to speak a Word or two concerning Geographical Dictionaries.

§ 1. Geographical Dictionaries lose half their Use by being ill contriv'd: I am of Opinion, that there ought to be a Connexion between every Country and all its Parts,
and

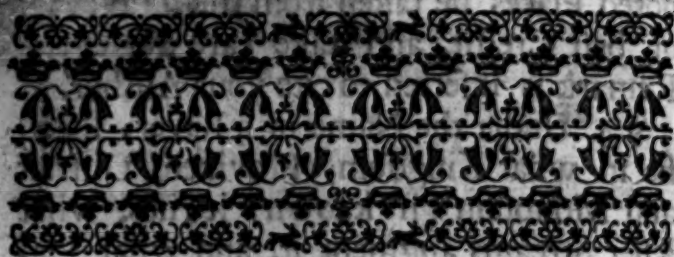
and that to find any Place in a Kingdom there should be no Necessity of knowing the Name of it beforehand, as there is in using the Books of this kind hitherto publish'd. To effect this it would be easy observing the following Method. First, the History of each Kingdom, Country or Island, being introduc'd under its proper Name, let the Provinces into which it is divided, be nam'd only, as also the principal Rivers, Lakes, Mountains, &c.

§ 2. Under the Name of each Province, after having observ'd what Kingdom it belongs to, described its Bounds, and shewn the Difference (if remark'd) of its Soil and Inhabitants from those of other Provinces, next subdivide it, recounting the chief Towns (or as many as you design to insert in your Dictionary) of each Subdivision, as also the Rivers, Lakes, Mountains, Artificial or Natural Curiosities peculiar to it.

§ 3. Under the Name of each City, Town or Village, put down in what Kingdom, Province, and Territory it lies; in the Description give the Latitude and Longitude, distinguishing whether they be taken from an actual Observation, or the MAPS. Let its Distance from some
noted

noted Places be taken from the Travellers of best Credit, and take care for every Remark is inserted to cite your Author.

§ 4. Under the Name of a River, specify in what Kingdom, Province, District and Mountain (if known) it rises, what lesser Streams augment it, and what Places it washes in its Way to the Sea, describing the Harbour it makes, its Conveniencies and Inconveniencies for Trade: The like must be observed in the Description of Mountains, Lakes, and all Things else. By this means there wou'd be an inseparable Communication kept up betwixt every Part of a Country, so that by only tracing the Places, one that does not know the Name of a Town, may readily have a View of all that is contained in the Dictionary relating to each Kingdom, as complete as from a Book of Geography, which is a Qualification the Dictionaries hitherto made, do want, in which one can seldom trace more than the Provinces, (nor always that neither) and the chief Town of each.



CHAP. VI.

*Some Observations upon Travel-
lers, their Negligence, and the
Defects of their Accounts; with a
Catalogue of the best that treat of
any Part of Asia, Africa and A-
merica.*



Ravelling is advantageous or
prejudicial, according to the
Disposition or Capacity of the
Adventurer; it is a Task that
shou'd be left only to the
Well-bred and Curious, who make their
Improvement in Knowledge the End of
their going abroad. Such a Person's Plea-
sure is augmented an hundred times more
at the sight of new Objects, than his who
is capable of making no Reflections on
them;

them ; and he finds in every Thing he meets with Entertainment enough to recompense and sweeten the Fatigues of Travelling.

We have but very few Remains of ancient Travels, besides what we find scatter'd up and down in Historians ; and for many Ages People contented themselves to sit at home and view their own Grounds, without being excited with a Curiosity to see their Neighbours ; till about two Ages ago, when that great *Genius* for Travelling appear'd and influenc'd all the Maritime Nations of *Europe*. Before half the World lay hid from us, and all the Commerce which the Ancients had with the Oriental Countries was broken off. But *Columbus*, by his unparallel'd Example, having shewed the Way to find out new Worlds, and discovered *America*, the entire Discovery of that Continent ensued by *Americus Vesputius*, *Pizarro* and his Followers, in Honour of *Spain*. The *Portuguese* first passing the *Cape of Good Hope*, carry'd their Arms as far as *India*, and conquer'd many Kingdoms, Coasts and Islands, under the Conduct of their Renowned Generals *Vasco di Gama* and *Albuquerque*; the *English* and *Dutch* soon follow'd them there, and also made several new Discoveries to the North and North-

North-East, &c. At the same Time these Expeditions were carrying on by Sea, the like generous Principles inspired them with a Curiosity to visit foreign Countries by Land, and made them penetrate into the most obscure Regions of *Africa, Persia, India, China, and Tartary*, intirely unknown to the Moderns; to many of which Discoveries we at this Day owe all our Knowledge of those Parts. In short, there was not any of Note that had not perform'd his Voyage to the *East or West Indies*, or some other remote Parts, not to mention the every-day Pilgrimages to the Holy Land. But now that noble Spirit is almost quite departed, and *Pliny's* Observation on his Age may be apply'd to ours, That now a-days Men are grown lazy and enervated, the End of Navigation laid aside, and the Desire of seeking new Worlds and Regions quite extinguished.

The Negligence of the Generality of the Geographers can be no excuse for a Traveller's not making due Observations; for tho' such as don't at all consult them, can't lay the Fault of their Incorrectness at their Door, yet the Curious are at a great Loss upon account of their Negligence, and manifold Defects.

In the Historical Part, indeed, many of the Travellers abound in Particulars; but in the Geographical, and their Itineraries they are generally very defective. Some think it is enough to mention the Stages of every Day's Journey, and may be the Distances in Miles or Hours from one to the other: And some have travelled 20 Days together, without making more than some trifling Remarks on the Goodness or Badness of the Way, or introducing some Story to fill up the Room; and it's a common thing to make a Skip at once from one Country or Capital City to another, without letting any one know how they got thither. Others Diaries are often broken and imperfect, not mentioning all the Places they pass'd thro', nor always observing the Distances between them; insomuch that it is impossible from them to mark the Situation of Places in a MAP with any Certainty. I have often admir'd, that so curious a Person as Sir *George Wheeler*, was not more exact in describing the Road between *Bursa* and *Smyrna* in *Natolia*.

In reading Travels, it cannot but often fret the Curious to find the Situations of many Places of great Importance to Geography left undetermin'd, when it was in the Author's Power with ease to have

done it. Thus *Gemelli* tells us, when at *Erzerum* in *Armenia*, he was within six Hours Journey of the Head of the *Bu-phrates*: But we are little the better for his being so near, when by his slipping the Opportunity of going to it, it requires as much as ever a Journey of some Thousand Miles, to know the Certainty of what he might so easily have determin'd. To as little purpose does *A-vril* tell us he was at *Ganges* in *Persia*, when he leaves us no Certainty where it lies: But indeed the generality of Travel-ers so little consider what shou'd make their Remarks acceptable or useful to the World, that it does not appear by their Accounts, that they carry any sort of Instrument with them for making an Observation, not even so much as a Compass for taking the Bearing. By such Neglects as these, how often do Travel-ers give the Curious Trouble to write large Comments, nay, whole Books to determine the Situation of a Place, when they might with ease have put the same beyond Doubt?

Then those that are most particular often disagree so strangely, that one is at a loss whom to depend on. For instance; compare the Road between *Ardebil* or *Tauris* and *Ispahan*; or between *Ispahan*,
Sciras

Scitas and *Gamroon* in *Persia*, out of *Tavernier*, *Olearius*, *Fryer*, *Gemelli*, &c.

Few Travellers hitherto have been so Curious as to observe the Latitude of Places, which they generally borrow from one another, or the MAPS, for there is no

The Tables of Latitude and Longitude, in Tavernier, are not to be depended on, nor indeed any extant.

doubt to be made but they give us many Things which are only Collections from others, tho' they are not willing to own it. Who does not see that *Strays's Travels* is a Collection from *Olearius* and others? And tho' it is not always so easie to trace the Thefts of Authors in the History, where there is often a Necessity of relating the same Things that have been said before, and which may be disguis'd under the Stile, yet their being so copious in that Part, and jejune in their Geographical Observations, renders them not a little liable to Suspicion.

Sir *John Chardin* (*) falls (*) Pag. 248. foul on former Travellers for not taking notice of the Lake *Deria Shirin*, or *Kiagar Counison* to the North of *Eri-van*: "A wonderful Thing, says he to me, that among all our Travellers into *Persia*, not one shou'd make any mention of it" (tho' by his leave, *Tavernier* did before him) "by which Defect (he

" goes on) it may be judg'd those Au-
 " thors were little curious after the Rari-

ties of the Countries they
 (b) Page 245. " pass'd thro'; tho' but a little
 " before (b) he pass'd thro'

many Towns and Villages himself, with-
 out mentioning so much as their Names.
 And how curious was Sir *John*, when the

the ingenious *Persian* Lord
 (c) Pag. 366. (c) shew'd him several MAPS
 of a Province of *Persia*, which

he promis'd him Copies of, that he went
 away without them? I remember *Le*
Blank tells us somewhere in his Travels,
 That he met with a Painter in the *Indies*,
 who gave him some curious M A P S and
 Draughts of Cities; but that is all we
 find of them.

Next, to exact Geographical MAPS, I
 know not what is of more Use in Tra-
 vels than Plans or Prospects of Cities,
 and Figures of the Inhabitants, Birds,
 Beasts, Fishes, Plants, and the like; for
 they are of themselves a kind of History,
 and yet few take the Pains to illustrate
 their Accounts with them, as they ought,
 for that Improvement does not consist in
 the Number, but Choice of the Cuts. As
 to MAPS, 'tis true, some Books have that
 Advantage: For Instance; *Wheeler* has
 given a very curious one of Part of *Greece*,
Lobier

Lobier of *Siam*, and his Voyage up the *Menan*; *Paul Lucas*, of his up the *Nile* as far as the *Cataracts*; *Olearius* of the *Wolga*; but his MAP of *Persia*, no more than *Isbrand Ides's* of *Tartary*, is to be depended on, further than the Roads they travell'd; and for *Herbert's* MAP of *Persia* and the *Caspian* Sea, (tho' thought worthy to be inserted in the *Navigantium atque Itin. Bibliotheca*) it is altogether false; and the MAPS in *Dr. Fryer's Travels* don't exactly agree with the Journals.

Another Obstacle to our further Knowledge of unknown Parts is, That Travellers seldom take those Roads into Countries that have not been travell'd often before: 'Tis true, some have (or at least pretend to have) travell'd into Foreign Countries by Ways unfrequented by former Travellers; but what the better are we when they give us no Account of them? And 'tis worth observing, that those Roads which they are most particular in, have been travell'd and describ'd very well before; whereas when they happen to take any new Way, and might have made useful Discoveries, they are altogether silent. Thus we find *Tavernier*, tho' in other Places generally curious enough in his Journal, gives no Account at all of his Journey from *Ispahan* to
P 3
Kerman,

Kerman, neither does he give any Description of the Road from *Goa* to *Golconda*; nor does *Beritus*, or *Navarette* that came after him; perhaps, for the same Reason, that might move *Tavernier*, namely, because others that went that Way before them gave no Account of it. In like manner *Avaril* describes his Journey from *Alexandretta* to *Aleppo*, and so by *Bir* to *Diarbekir*; but when he comes to the Road between *Beilis* and *Erzerum*, and thence to *Gangea* and *Schamachy*, which we wanted a Description of, he scarce says a Word of it more than what any one might gather from the Travels of *Chardin*, *Tavernier* and *Rubriquis*; the two first describe the Extent of the Lake he travell'd by, and the two latter occasionally mention *Gangea* as a fair City in a delightful Country; this gives Criticks occasion to question whether he was a Person fit to make Discoveries of unknown Roads, who describ'd them so ill; and infer, That his not performing the Voyage of *Tartary*, was no great Loss to the Publick.

I must needs say, it looks very suspicious, when a Traveller gives a Description of nothing but what has been describ'd before. But the Missioners have got a knack of late of forging Travels (witness

ness, *Hennepin*) and perhaps Celestial Observations too. 'Tis no more but to retire into the next Kingdom, and you may say you were where you will, and write what you please at your Return. 'Tis an easie thing to trick up a Book of Travels from various Authors, and then if the Contriver has but the Art to tell a few incredible Stories to amuse the People, it infallibly takes off the Suspicion, and makes it pass for genuine. *Struys* is one of your vamp'd-up Authors, and so is *du Mont*, some tell you; not to mention those old Story-tellers *Le Blank*, *Mendez Pinto*, *Litbrow*, &c.

'Tis in vain to pretend, in Vindication of their Neglect, that the Parts they travell'd wou'd afford no Remarks; for the Curious will never want an Opportunity of making Observations, nor is the greatest Desert barren of wherewithal to employ their Curiosity, witness *Teixira's* curious Journey thro' the Deserts of *Arabia*.

Mentioning *Teixira*, brings into my Mind what I have observ'd with respect to Travellers, viz. That the earliest are generally the most exact, especially in their Journals; and that the later they are, the more defective they prove in that Particular: For Instance, I don't know any Mo-

derh that has describ'd his Travels with greater Exactness than *Rauwolf* and *Gasper Balbi*, especially the latter, who went into the *Indies* by the Way of *Euphrates* and *Tigris* in 1580, and has given the most particular Account, by much, of any that came after him.

Don John de Castro's Voyage up the *Red Sea* to *Sues* in 1540, and In *Purchas*. earlier than the former, is no doubt, one of the most curious and complete Journals extant; and the best, I may say the only good Account we have of that Sea in any Language; for he observes the Latitude, Distance and Bearing (which are the principal Things a Traveller shou'd observe) of all the Ports and Towns he touch'd at along the Coast, particularly on the Side of *Africa*: Yet what is much to be wondred at, he is not quoted by any Geographer that I can find, or consulted in the MAPS (except now of late in *De Lisle's*) tho' nothing cou'd be more erroneous than their Representation of those Parts, especially towards *Sues*, which the MAPS and Charts made to end in a wide Bay 40 or 50 Miles at least a-cross; infomuch that some Divines depending upon them, have been led astray in their Conjectures about the *Israelites* passing the *Red Sea*, concluding it impossible that
such

such a Multitude cou'd cross so great a Breadth on Foot in a Night's time; whereas, had the MAPS been drawn according to *Don John's* Journal, who makes it not over Nine Miles, and in one Place but Three Miles a-cross, for above 28 Leagues from *Sues*, the Difficulty had been remov'd, and *Le Clark* in his Dissertations might have allow'd it a Miracle.

Biddulph's Travels into *Syria* and the *Holy Land*, and *Finch* into the *East Indies*, are as particular as any since; not to mention *Sandys*, *Herbert*, *De la Valle*, and *Olearius*, who were some of the earliest and best in the last Age, especially the two last, who, methinks, deserve the Preference of all others, for having observ'd the Latitude of the principal Towns they were at, and being generally very particular in noting the Distances of Places.

I admire thro' what Accident we came to have only * one Part of *De la Valle's* Travels translated, and that the last, and least extraordinary too. This leads me to observe, with respect to Translations, that they are generally ill chosen, and worse handled, and the Town is amus'd with rambling Voyages (which 'tis strange how they please) whilst many Pieces that are

* *De la Valle's* Travels are in 3 Volumes in *Quarto*, and 4 in *Octavo* in *Italian*.

truly

truly valuable and instructive, he bury'd from the Generality of People in unknown Languages.

Thevenot, Tavernier, Fryer and † *Chardin*, in the middle Age are the most remarkable, especially the first, who was a most curious, judicious and faithful Traveller, a Man of Modesty and Learning; 'twas a great Loss to the World that he died returning home, by which means his *Persian* and *Indian* Travels are not so complete as they would have been, had he liv'd to publish them himself. There is very much of the Gentleman in *Tavernier*, who diverts while he instructs, and claims a Place in the first Rank of Travellers.

I must, however, do Justice to *Gemelli*, and own that his Travels round the World, which are the newest extant, are nevertheless as curious and complete as any before publish'd; and what adds to their Value is, That he describes the Roads between *Schiras* and *Bender Congo* in *Persia*, *Goe* and *Galgala* in *India*, which no Traveller, that I can find, went before him, no less exact than the more frequented Roads through *Persia*, &c.

† *Sir John Chardin* has publish'd 2 Vol. more of his Travels in French, with curious Draughts, particularly of *Persepolis*.

I would

'Twould be endless to particularize all that have publish'd Accounts of their Travels: But that the Curious may know which to make choice of, I shall mention the best extant that treat of any Part of *Asia*, *Africa* and *America*, the Voyage of *Europe* being so well known, that nothing need be said thereof.

To begin with *Turkey* in *Asia*, for *Natolia*, *Wheeler*, *Thevenot*, *le Bryn* and *Gemelli* describe the Road from *Bursa* to *Smyrna*; for the Roads from those two last Places to *Erzerum* in *Armenia*, and so into *Persia*, consult *Busbequius*, *Newbery*, *Boulay de Gouz* (in *French*) and *Tavernier*. *Dr. Thomas Smyth*, and *Sir Paul Ricaut* have given two curious Accounts of the State of the the Seven Churches of lesser *Asia*.

For *Syria*, the *Holy Land*, *Mount Sinai* and *Egypt*, you have very many; the best are *Bridenbach*, *Baumgarten*, *Christopher Fuxer*, *Bellonius* (all Four very ill abridg'd in *Purchas*) *Vitriacco*, *Brocard*, *Cotovius*, *Weissenberg*, *Huen*, *Bastavius*, *Ben-jonas*, *Medina*, *Meggen*, *Rawolf*, *Reisneri*, *Villamont*, &c. who writ before the Year 1600; after which came *Sanderson*, *Newbery*, *Biddulph*, *Timberly*, *Morrison*, *Sandys*, *Baglioni*, *Eramyusperg*, *Hese*, *Mantegazza*, *Quaresmius*, *Radzevilas*, *Zuallart*, &c. and of latter Years, *Berdini*, *Philippus*, *Surius*, *Moncomys*,

comys, Leo, Dapper, Castillo, Audriex, Justinien, Rochetta, Bremond, Thevenot, Le Bryn, Gemelli, Maundrel, Dandini to Mount *Libanus*, and *Vansleb* to *Egypt* only.

For the Desarts of *Arabia* and *Mesopotamia*, are *De la Valle, Teixeira, Thevenot*. We have no Accounts of the inland Parts of *Arabia Felix*, but what the *Nubian* Geographer affords, except the Roads of the Pilgrims from *Cairo* and *Bassora* to *Mecca* in *Thevenot*, and *Sir Henry Middleton's* Journey from *Mocca* to *Zenan*; not to mention the Travels of *Vertoman* or *Barthema*, as *Ramusio* calls him.

Rawolf's, Gasper Balbi's and *Newbery's*, are the only Accounts we have of the Voyage down the *Euphrates* to *Bagdat*, if *Purchas* has done more Justice to *Casan Frederick, Eldred, Fitch, Cartwright*, and *Sir Anthony Sherly* than to *Balbi*; all which it appears made their Voyage, but relate no Particulars of it: Each of these, especially the two first, give a good Account of the Ruins of *Babylon*; but *De la Valle* in his Journey from *Bagdat* to *Hella*, seems most curious. There are the *Nubian* Geographer, *Thevenot* and *Tavernier*, for the Road through *Mesopotamia*, and from *Mosul* on the *Tigris* to *Bagdat*, from whence the Voyage to *Bassora*, and to the *Indies* by Water, is particulariz'd by *Tavernier, Eldred,*

dred, Boulay de Gouz, but especially by *Balby*, and (from *Bassora*) by *Thevenot*.

The Travellers that give the best Account of *Persia*, are *Johannes de Persia*, *Barbarus*, *Contarino*, *Figuera*, *Herbert*, *De la Valle*, *Hems*, *Olearius*, *Mandeslo*, *Philippus*, *Swaert*, *Tavernier*, *Chardin*, *Thevenot*, *Sanfon*, *Fryer*, *Gemelli*, &c. *De la Valle* has writ an Account of *Georgia*, *Mingrelia*, &c. as also *Archangelo Lamberti*, *George Iterian*. *Chardin* describes *Imiretta* and *Mingrelia*, and *Olearius*, *Circassia*; as does also *Bronjof Ananias*, *Baron Herberstein*, *John de Luca*, *Sorenzo*, and a certain Anonymous Author at the End of *Tavernier's Travels*; all which treat of those Countries.

For *India* the best are *Finch*, *Terry*, *Linscoten*, *Jarric*, *Sanutus*, *Maffeus*, *Sir Thorow*, *Herbert*, *De la Valle*, *Mandeslo*, *Boulay de Gouz*, *Bernier*, *Tavernier*, *Twist*, *Tossi*, *Newhof*, *Thevenot*, *Ogleby*, *Fryer*, *Ovington*, *Delon*, *Gemelli*, &c. *Lobier*, *Chaumont*, *Choisy*, *Tachard*, and the Six Jesuits to *Syam*; *Borri* to *Cochinchina*; *Balbi* to *Pegu*; *Tavernier* to *Tunquin*.

To *China* the best are *Magallans*, *Ogleby*, *Le Compt*, *Navarette*, *Gemelli*, &c.

For *Tartary* we have *Paulus Venetus*, *William de Rubriquis*, the Reports of several *Tartarians*, *Jenkinson's Voyage to Boghar*, *Bronovius* to *Crim Tartary* (these in *Pur-*
(*chas*

chas) *Dorville* and *Gruberus* from *China* thro' *Tangut* to *India*; the *Travels* of a *Tartarian* Prince from *Herat* in *Persia* to *Catay*, (in *Thevenot's* Collection) *Verbiest* into the *Eastern Tartary*, *Jacovitz Boicow* from *Moscow* to *China* thro' *Mongalia*, *Avaril*, and the late *Travels* of *Isbrand Ides*, *Embassador* from the *Czar* of *Moscow* to the *Emperor* of *China*, and of *Adam Brand* *Secretary* to the *Embassy*; which two last are the best *Accounts* we have yet of that vast *Region*, till the curious *Mr. Witzgen*, who sometime ago published a *MAP* of *Tartary*, obliges the *World* with a *History* thereof, which *Laitz* tells us, he has been collecting during these 20 *Years*; besides the late *Surveys* the *Missioners* to *China* have made in (a) that *Country* and *Tartary*, will, when they appear in *Europe*, no doubt, give us a new *Light* into those *Parts*.

As to the *Islands* of *Asia*, there are *Knox*, *Riburo* and *Baldus* for *Ceylon*; the *Conquest* of the *Philippine* *Isles*, and *Gemelli* for those; *Candidius*, and *Esalmanazar* of *Formosa*; *Argentola* of the *Molucca's*; *Pyrrard de la Val* to the *Maldives*: There are divers *Accounts* of *Borneo*, *Java*, *Sumatra*, and other *Islands* of lesser *Note*, to be found in *Voyages* to the *East Indies*.

(a) *Missioners Travels into India, China, &c.* pag. 215 and 225.

Africa is not so well known or frequented as *Asia*; the general Historians are *Leo*, *Marmol*, *Metellus*, *Gramajé*, *M. Llois Sanudo*, *Le Croix* and *Dapper*, which is reckon'd the best extant, and his 'Abridger *Ogley*. The Travellers into *Egypt* are mention'd already. The In-lands of *Barbary*, *Zara*, *Biledulgerid*, and the lower *Ethiopia* almost intirely unknown.

For *Abyssine*, or upper *Ethiopia*, there are the Patriarch *Bermuda's* Travels, *Almeida*, *Peter Pais*, the Jesuits Letters, *Ludolphus*, *Paul Luca's* Voyage up the *Nile*, from *Cairo* to the Cataracts, *Ponnet*, &c. But the completest Account we have of that County, is *Historia del Ethiopia per Telles*, being a Collection of all the aforesaid Authors, one or two excepted; 'tis translated in one of the two Volumes of Travels and Voyages in 4to lately publish'd.

To *Morocco* there are *Moquet*, *Movett*, *St. Olon*, *Estat des Royumes de Barbarie*; *Frejus* to *Mauritania*, *Janequin* to *Libia*, &c.

There are several Voyages to *Cape Verde* and the Islands; *Jobson's* Voyage to the River *Gambia* for the Discovery of the Gold Trade, *Bosman's* Description of *Guinea* is the best for that Country.

Pigafetta, *Michael Angelo* and *Dennis Carli*, *Merulla da Sorrenta*, *Garini*, *Almaradink*, &c. to *Congo*.

The

The best Account of the Cape of Good Hope, is *Ten Rein's*.

There is the History of *Madagascar* by *Flacourt*. 'Twould be endless to name all the Accounts we have of the Maritime Countries, some or other of them being still touch'd at by almost every Ship that goes to, or comes from the *East Indies*.

America being for the most part possess'd by *Europeans*, is become pretty well known: General Historians are *Lopes*, *D'Acosta*, *Herera*, *De Laet*, &c.

For the *Spanish* Acquisitions there, we have the Conquest of *Mexico*, *Gage's* Survey, Account of the *Spanish West Indies* by *Alexander Ursina*, *Casas*, and others; *Conquista del Peru* by *Augustin de Zorata*, *Vega*, *Cieza*, *Acarete*, &c. Description of that Country; *Ant. Sepp's* and *Nic. del Techo's* Voyage to *Paraguay*, *Alonso de Ovales*, History of *Chili*, and many more.

For the *British* Part, there are the *British* Empire in *America*, several Accounts of the first *English* Plantations in *Virginia*, by *Smith* and others; *Lederer's* Discovery from *Virginia* to the West of *Carolina*, the Present State of *Virginia*, Accounts of the Discovery and first Settlements in *New England*, *New York*, *Mary-land*, *Pensilvania*, *Newfoundland*, &c. Voyage to *Darien*, *Dampier's* Voyages, *Ligon's* History of *Barbadoes*, History of *Jamaica*, of the *Carabe*

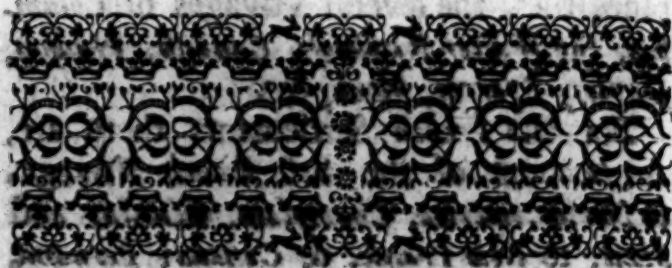
rabee Isles, the several Voyages of *Columbus*, Sir *Walter Rawleigh*, *Candish*, *Hudson*, *Davies*, *Sparrey*, *Monk*, &c.

For the *French* Settlements there are, An Account of the first *French* Voyages to *North America*, *Champlain*, *Geuxius* and *Mont*, to *New France*, or *Canada*; *Fernand*, *Soto* and *Navarez*, to *Florida*; *De la Salle*, *De la Hontain* and *Henepin's* Travels into *North America*.

To the *Dutch* and *Portuguese* Acquisitions in *Brazil*, we have *Newhoff's* Description thereof, and an Account of the Proceedings of the Missioners there, with a few more.

Besides there are many Voyages to the South-Sea, as *Magallans*, *Sebald de Weert*, *Spilbergen*, *Cornelison*, &c. To the *Magellanick* Straits, Sir *John Narborough's* Voyage, *Cook's*, *Wood's*, &c.

Seeing the World is so well stock'd with Books of this kind, 'tis a Wonder the Geography of it is no more improv'd; but the Generality mind only the Natural and Moral History, so that *Misson* well observes in his Preface, "That the new Discoveries of a whole Age would scarce fill a small Volume: For as to the many Voyages to the *Holy Land*, *Persia*, *India* and *China*, what is it more than giving us over and over again the same Account of Things which had often been given before?



C H A P. VII.

Instructions for Travellers in making their Observations ; with a Request to Merchants, and Missioners into Foreign Parts, in whose Power it is to be very serviceable to Geography.



R. Boyle in his Book, call'd, *The Natural History of a Country*, has given Directions for Travellers in making their Enquiries and Observations in Foreign Parts ; so has Leigh in his *Diatribe of Travel*, and many others, as Howel, Hall, Palmer, Jones, Sir Balth. Gerbier, Negebauerus, Loyzans, Sorbier, Zeilerus, &c. whom he mentions : *Misson* has done the like, and several Travellers besides him. Mr. *Eachard's*

Eachard's Rules for making a Complete Geography, may also serve for a Traveller. I shall only add, that there are very curious Instructions for a Traveller, especially with respect to *Asia*, in the Introduction to Mr. *Churchill's* Collection of Voyages and Travels. But these being for the most part Directions for their Behaviour abroad, or making their Remarks chiefly with respect to the Natural, Moral and Political History of Countries; I shall only give some Directions to a Traveller for making his Geographical Observations.

A Traveller that would benefit himself and others by going abroad, should qualify him beforehand in Geography, Designing, and so much of Astronomy, at least, as may enable him to take the Latitude of Places, and the Longitude by Eclipses: A Person thus prepar'd, will be capable of making his Observations to the best Advantage, and will find in every thing that occurs somewhat to employ his Curiosity.

A Traveller should not ride through a Country as if he carry'd an Express, nor idle at Towns, but shou'd still be making little Excursions round the neighbouring Places, and observing all the Curiosities to be seen in and about them.

If a Traveller wou'd make his Observations serviceable, either to the present or future Age, he should be particularly exact in describing the Roads. We have so many Historical Accounts of most Parts, that Travels now can be valuable for little more than their Journals; a Heap of Historical Observations, which often have nothing new or different from others that treat of the same Parts, but the stile, can never make amends for a Voyage of many Days, Months or Years wasted in a few trifling Occurrences.

For making an exact Itinerary or Journal of his Travels, let him observe these few and easie Directions.

1. Let the Traveller be provided with a true going Watch, set to the Time of the Day at the Place he departs from, just at his setting out, and observe the Difference of Time at the next Place of Note he arrives at, and so on, which may go near to determine the Difference of Longitude between them: No Traveller as yet has been so curious as this comes to.

2. A Traveller should associate himself with some of the Company, or Caravan that have gone the Road before, that may inform him of all the Curiosities in and near the same, about which he shou'd be
very

very inquisitive; as also to ask every now and then what Towns or other Places lie near hand on one side and the other; and when any Road occurs that falls in with that he travels, should enquire what Place of Note it leads to. *Thevenot* was particularly curious this way, and has left us two Journals of the *Mahometan* Pilgrims to *Mecca*, one from *Cairo*, and the other from *Bassora*, which there was no coming by, otherwise than by Information. He was also one of those that made Enquiries after the Head of the *Nile*, and gave a very good Account of it: Nor must I forget Mr. *Finch* in *Purchas's* Collection, to whom, for his Enquiries, we are much beholding at this Day.

3. He ought to enquire very carefully after the Distance between Place and Place, and by the Rate he travels at, may judge which Computation is most exact; for he will meet with various Accounts of the Distances between Places in Foreign Countries, in the same manner as in his own: *Finch*, *Texira*, *De la Valle*, *Fryer*, *Tavernier*, *Chardin*, *Thevenot* and *Gemelli*, are the best for that.

4. He should observe with a Compass, as near as he can, the Course he travels, or the Bearing of Places one from another, which is easily done in those Parts,

where the Roads lie often thro' plain or desert Countries, and where one may have a View of the Land for many Leagues about, especially if it be taken from an Eminence. 'Twas thus Sir George Wheeler made his curious Observations in Greece, where he had the like Conveniency. *Teixiera, De le Valle, Olearius and Thevenot*, are the Chief that observe the Bearing of Places.

5. He shou'd not pass the least River or Brook without mentioning its Name, and observing which Way the Current runs, and to enquire after its Source, or where it comes from, what Town it goes to, and River it falls into. *De le Valle, Olearius and Thevenot*, are the most exact in this respect.

6. He shou'd take the Draught or Prospect of Cities, Towns, Forts, Buildings, Ruins, and all other Curiosities of Art and Nature, without which one can never conceive a perfect *Idea* of things, as giving a more lively Description of Places than Words. *Sandys, Herbert, Tavernier, Wheeler, &c.* excel in this; but especially *Newhoff, Baldeus and Le Bryn*, who have given the best Part of their Accounts in Cuts.

7. He shou'd, above all things, for the Improvement of Geography, take the Latitude

itude of Places. How easie wou'd it be for a Traveller, ever and anon, to make an Observation with an Instrument, which he might carry in his Pocket, that wou'd take the Latitude within ten Minutes at most: If this Method were duly pursued, it wou'd go near to determine the Difference of Longitude and Bearing between Places, by help of the computed Distances adapted with Judgment, especially the nearer his Course inclin'd to the East or West. *De la Valle, Olearius* and *Wheeler* (except *Fibran* and *Ides*, may be depended upon) are the only inland Travellers that have observ'd the Latitude of Places.

8. He shou'd draw a MAP of his Travels, if he can conveniently, on the Spot; for who so fit to do it as the Traveller himself? Those Authors that have oblig'd the World in this Particular, are mention'd in the last Chapter.

9. While he resides at the Metropolis of any Foreign Kingdom, he shou'd consult the Geographers and their MAPS, if they have any, which I have admir'd neither *De la Valle, Olearius* nor *Thevenot* have done, who were so curious and capable of doing it. *Chardin*, if I mistake not, in the first Volume of his Travels, promis'd us a Description of *Persia*, collected from the *Persian* Geographers and Histo-

rians; which, if rightly perform'd, is the only best way to come at a true Knowledge of that or any other Country.

10. Let him observe the Eclipses of the Moon and Planets, particularly of *Jupiter*, by his Satelites, as often as he has an Opportunity. The Jesuits, in their Voyage to *Siam*, have by this means determin'd the Longitude of several Places in the *East Indies*.

The observing these Rules will be so far from being troublesome to the curious Traveller, that nothing will be a greater Vexation to him than the want of Opportunity to put them in Practice, as often as there will be Occasion; for nothing is so pleasing to the Curious, as making Discoveries in the Science they delight in; 'tis this which lightens the Fatigues of Travelling; and while the Merchant, or Man of Pleasure, looks upon every Day spent on the Road as so much lost Time; the judicious Traveller likes the Journey the better for being long, that he may have an Opportunity of discovering more of the Country.

Wou'd our young Merchants, and Factors, as well as others that go abroad, but qualify themselves a little before-hand, as premis'd, how much more satisfactory might they make their Voyages and Travels

vels to themselves, and beneficial to the Publick at their Return? It must sure be a Vexation to some that have travell'd very far, to reflect what rare Opportunities of making great Discoveries have been lost for want of no more Knowledge in Matters, than a few Hours would have given them.

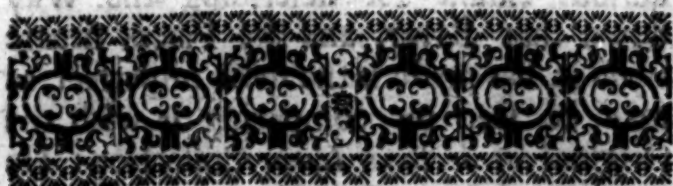
How easy wou'd it be, as I intimated before, for our Merchants and Factors (who often have Business up the Country where no Traveller has been, that has published Remarks) to take the Latitude, or at least to set down the computed Distances of all Places on the Road; there is no question many have done it, but have suppress'd their Observations, imagining that they can communicate nothing that would be valuable, except they write a copious History. But such should know, that a few Observations of that kind wou'd be more acceptable to the Judicious, than the largest Historical Account they cou'd make up. Travellers would mend, if we cou'd but make them sensible it is not the History we want.

It were to be wish'd the Moderns were as zealous as the first Travellers into the *East* and *West Indies*, who spar'd no Pains to make them known to us. If their Example were but follow'd, and the preceding

ceding Directions observ'd, we might soon come to a pretty perfect Knowledge of those remote Countries which are frequented by Europeans.

How easy wou'd it be for the Missioners who have settled in all Foreign Countries, especially the Eastern, to transmit Accounts of the same. 'Tis true, they have sent over several; some of which were lately printed, but any one of the least Curiosity must read them with Impatience, to find they mention considerable Places scarce ever heard of in Europe, but very well known to them by their Travels and Residences, and yet give us no manner of Light as to their Situation; insomuch that if one did not sometimes meet with *India*, *China*, &c. by which he is something guided or assisted in his Guess, he would be apt to conclude they were in *Terra incognita*.





C H A P. VIII.

Shewing the Defects of our great Collections of Travels; with Rules for making a Complete Collection of all the Voyages and Travels extant in any Language, in a moderate Compass.



VERY one will agree with me, that the Generality of Books of Travels being incorrect, as I have observ'd, was bad enough; but what is still worse, those that have undertaken to make Collections, have often, by unfaithful Abridgements, made those that have been bad, more imperfect, and others useless that were before the most complete.

Purchas, particularly in his Abridgment of *Balbi's* Voyage down *Euphrates*, has quite spoil'd it; and from being the most curious

curious extant for describing the Way down that River, and the Places situate upon it, has made it the most imperfect, as may be seen by comparing it with the Original in *de Bry's Latin Collection*: He has done the same Injustice to the Travels of *Christ. Furer, Bridenbach, Bellonius, &c.* to the *Holy Land*; as also to his Collections from the *Nubian Geographer*; so that there is no depending on him where he does not give the Authors entire. What signifie such defective Collections? They are but Superfluities, fit only to be put among the Charters, Letters-Patents, &c. which make up the useless Part of his Volumes.

There is another large Collection lately published in two Volumes, *Fol.* no less remarkable for Defects of this kind; the Design of it is very good, but quite frustrated for want of careful or skilful Abridgers. The Itineraries are generally cut so short, that they are of little or no Use; even *Purchas* is out-worsted, and the Authors by him abused, have suffer'd a second time worse than the first, as appears by the said Voyage of *Balbi*, which is there contracted in a few Lines. *Fitch's Travels* are abridg'd twice over, the first time containing 8 Pages, the last not one, under the Title of *Smith's Travels*; tho' in *Purchas* it takes up 14 large Folio's. The Road
from

from *Smyrna* thro' *Natolia*, out of *Tavernier*, is not only vilely brief'd, but preposterously joined to a different Road above 1000 Miles out of the Way; for from *Tocat* in *Natolia* there is a Skip made at once to *Kerman* in *Persia*, as if the Distance was but a Stage or a Day's Journey of the Caravan: An Absurdity which shews the unfitness of the Abridger, who could never have committed it, had he any Skill in Geography, or taken the least time to consider the Author. *Thevenot*, who in the Opinion of every Body, must deserve a Place in the most curious Collection, is there abridged but in Part, and that much to its Disadvantage. In short, the Places where not only the Itineraries, but even the History (in which that Collection aims to excel) are mangled and depriv'd of the best Part of their Substance, are innumerable, tho' many things at the same time are inserted, which might have been left out; so that it is so far from being a good Abridgment, that it has made the Originals more valuable than before, and which is one Comfort, can never occasion the loss of them. I am far from charging these Faults on the Undertaker of the *Bibliotheca*, but think none ought to have been employ'd in abridging the Authors, but such as knew how to distinguish the Substance from the Shadow,

Shadow, and that nothing which any way related to the Geography or History, shou'd be left out.

The chief Design of Collections of Travels, was to preserve the most valuable Tracts of that kind from being lost, by printing them together in one or more Volumes. *John* and *Theodore de Brie* were the first that made a Collection of Voyages and Travels, which is in *Latin* in six thin *Folio's*, three of the *East*, and three of the *West-Indies*, printed at *Frankfort*, 1591. It contains all the best Pieces that were published before that time; is full of Cuts, and esteem'd a very valuable Work.

After that *Ramusio* published a large Collection of Voyages and Travels in 3 Vol. in *Italian*, printed at *Venice*, 1588. which is look'd upon by some to be the completest Work of the kind yet published in any Language; but it has not the Advantage of Cuts as *de Brie's* has.

Hackluit came next, but far short of either of the former; he made a Collection in *English* of all that came to his Hand, mixing the good with the bad, and stuffing his Books with Charters, Letters-Patents, &c. which only swell and incumber them.

Purchas had gone beyond any that collected Travels before or since, if he had not followed his Predecessor *Hackluit* in crowd-
ing

ing in such useless Stuff as Charters, Patents, &c. and spoil'd several of his best Authors in not well abridging of them. However, the Collection is very valuable for a great Number of curious Pieces that else wou'd have been lost.

Next, *Thevenot* (famous for his own Travels) made a Collection in *French* of all the best Voyages and Travels down to his Time, a great Part of which are Translations from *Purchas*, but 'tis much improv'd with later Accounts, especially the last Edition in 2 Vol. *Fol.* The Collection is very curious, and illustrated with Cuts.

It wou'd be Injustice, as well as Ingratitude, not to give *Ogleby* a Place among those that have oblig'd the World this Way: He spar'd no Cost to give his Books the Advantage of Sculptures; and his Works are of abundance more Value than the Generality of People, it seems, are sensible. If I ben't mistaken, his *Africa* is a Translation of *Dapper* in *French*, which is look'd upon by some, and in particular by the Author of the Introduction to *Church's* Collection in the Catalogue of Travels, to be the most complete extant: However, I am sensible his Geography, as well as his Poetry, has suffered by Translators.

In 1704 four Volumes in *Folio* of Voyages and Travels were published in *English*.

valuable for being mostly Translations out of foreign Authors ; but they have the common Fault of the former *English* Collections, of being swell'd with some things that have no Business there. Thus, there are many long Passages, if not Chapters, in *Navarrette*, *Baldew*, *Nieuhoff*, and indeed, most of the Pieces, which had been better left out, and all *Monsons* Naval Tracts, which take up near a whole Volume, are nothing at all to the Purpose. However, 'tis well the Authors were not abridg'd ;

(a) Translated
from Thevenot's
Collection.

for were we to judge by the Travels of (a) *Jacowitz Boicow* from *Moscow* to *China*, the most entire are but stubber'd over.

Much about the same time came out the *Navigantium atque Itin. Bibliotheca*, which was as much upon the Extreme of Maiming, as the former were of Swelling. But for all that, it is not without Excrescences, witness *Boulaye's* Voyage to the *East Indies*, the *Buchanees* of *America*, &c.

Besides these of lesser Note, you have *Eden* and *Wills's* Collection, 4to. printed in 1577. *Biddulph's*, and other Travels into the *East*, collected by *Thomas Lavender*, 4to. printed in 1609. I have seen a small Collection in *Italian* in 3 Vol. 12mo. which is only a short Abstract out of *Olearius*, *De la Valle*, *Chardin* and others. There

There is also a Collection of Voyages and Travels in 2 Vol. 4to, that lately came out Monthly ; several of the Collections are very good, particularly the History of *Morocco*, *Ethiopia* and *Teixira's* Journal from *Bassora* to *Aleppo* through the Desarts of *Arabia*. If all the rest had been as well chosen, and instead of the Conquest of the *Spice Islands*, the Description of *Carolina*, &c. The Author had made a Collection of several old, but curious Pieces to be found in *de Bry*, *Ramusio*, *Thevenot*, and even *Purchas*, it had been more valuable, and met with a better Reception.

Tho' most of the foregoing Collections were complete enough for their time, yet now they are become defective for want of the later Discoveries. Besides, there are ny long Voyages in them which are not now so valuable, as when those Parts were little known, and then they are generally collected entire with all the Author's Redundancies of Words and Circumstances, which are very unprofitable as well as tedious. In short, the Collections hitherto published, are very voluminous, and yet altogether would not make one complete Collection.

The Design of the *Bibliotheca* was very good, but in case it had answered the End, a complete Collection of Voyages and Tra-

vels wou'd be still wanting in regard there are Numbers of Books of that kind, besides what are in *English*; to a Collection of which the Author seems to have confin'd himself, excepting two or three Translations that are inserted: And yet I dare engage that a Collection might be made after the Method I shall propose, not much exceeding the *Bibliotheca* in compass, and yet to contain the Substance of all the Voyages and Travels extant in any Language, which are some hundreds more than are there collected.

This will not appear so impracticable, when it is consider'd, first, That there is no necessity for introducing more of each Author than the pure Topography and History abstracted from all Adventures, and other Circumstances which have no Business in a Work of this Nature, where the Design is in as little Room as may be, to bring many Authors. 2^{dly}, That where there are several Travels to the same Countries, a general Collection of their Observations together may serve for all: For where is the Necessity of crowding in half a dozen or more large Accounts of a Country, which are little more than so many Repetitions of the same Things? ("It being almost impossible, to me
(a) Dr. Fryer in the Words of a certain (c)
his Preface. Author,

Author, " so many writing on the same
 " Subject, shou'd not in many, and the
 " most material Points especially, if they
 " follow'd Truth, relate the same things,) when one general Relation, that wou'd not take up a sixth Part the room, wou'd be as complete, and do as well; 'twould be but like your Chymical Preparations, where much is brought into little Room, and which lose nothing of their Substance from being more center'd.

For instance: Supposing I was to collect the Travels of *Herbert*, *De la Valle*, *Olearius*, *Tavernier*, *Thevenot*, *Fryer* and *Gemelli*, who all travell'd to the same Parts; I wou'd chuse out the most complete, supposing *Olearius*, and add whatever Observations the others had made over and above, which, I am perswaded, are so few, that they wou'd not go near to make up what might, without Prejudice to it, be cut off in the Abridgment: Nay, I may venture to say, if all the Particulars were thrown out in which they agree with one another, a few *Folio's* wou'd contain the Remains; so that all those Authors might fairly be contracted into less Compass than any one of them singly contains.

The Journals of the Travels which are to precede the History, are not to be inserted separately one after another, but inter-

mix'd according to the Roads: For Instance; the several Roads thro' *Persia*, in *Tavernier*, viz. from *Tauris*, *Mosul* and *Bagdat*, to *Ispahan*; and from *Ispahan* to *Gomroon* and *Candahar*, are not to be inserted altogether, before any other Author be taken in hand: But each Road, as from *Tauris* to *Ispahan*, is to be describ'd according to the several Authors that treat thereof, first; next that from *Mosul* to *Ispahan*, and so on after the same manner; by which means the Reader will have all the Journals to be found in Travellers between any two remarkable Places at one View, and many Oversights will be prevented, which wou'd inevitably happen, in case the Journals of each Author were inserted apart.

In collecting the Journals after this manner, begin with the most exact, augmenting the Description of the intervening Places out of the rest; and for every additional Remark note the Author's Name in the Margin, then insert the rest in order, with their several Observations of the Bearing or Distance of Places, and all other Occurrences, that the Difference between the several Authors may the more distinctly appear.

The Collector shou'd take care to omit nothing that may help to give light into the
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Geography or History; which Caution shou'd be observ'd more particularly with respect to the Itineraries, in regard the History, shou'd an Omission happen, may be easily retriev'd, when Ages might not recover the Loss of one curious Journal, considering of the many that write, how few take care to give us exact Diaries of their Travels.

Old Travels are to be priz'd by a Collector, and often preferr'd to the New, for many that were writ above 100 Years ago, are not only the best, but the latest Accounts we have of the Parts they describe. The Loss of old Journals is, no doubt, one Reason why we find more Names of Places in the old, than in the newest MAPS; and what a Condition wou'd the Geography of *Asia* be reduced to, shou'd *John de Castro's* Voyage up the *Red Sea*, *Rauwolf* and *Balbi's* down the *Euphrates* and *Tygris*, *Teixira's*, *Finch's*, and some other old Journals be lost for want of being gathered into a Collection.

It wou'd be endless to collect all the Coasting Voyages that are daily publish'd; 'tis enough to mention the Course they sail'd, and the Places they touch'd at, their Observations of Coasts, Towns and People, will come in best in the Description of the respective Countries,

And

And whereas many Countries produce the same kinds of Beasts, Trees, Fruits, Plants, Fowl, Fish, Birds, &c. the Description of them shou'd be collected in a particular Part, dispos'd in Alphabetical Order.

As to the Method in compiling such a Collection, let each Volume contain one Quarter of the World divided, for Method-sake, into Kingdoms and Countries (after the Manner of Geographical Books) under each of which, all that is to be found in the several Books of Travels extant, shou'd be collected: For Instance; in the Collections for *Persia*, or the *Indies*, no more of the Journals in *Tavernier*, *Thouvenot*, *Garnelli*, &c. are to be introduced, but what relate to that Kingdom only, the Remainder to be dispos'd in the respective Countries; so that every Kingdom wou'd contain a complete Collection of Travels apart.

As such a Performance wou'd require much Time and Trouble, it is not to be undertaken by any that regard their private Interest; and shou'd, if possible, be the Work of one Hand, or a Society of Men equally capable, diligent, and Lovers of Geography.

The Uses of a Collection of Travels made in this Form, wou'd be very great and many. For, first, it would preserve
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Numbers of valuable Pieces from being lost, and make those common that were not to be had before for Money. 2^{dly}, It wou'd save the Expence of buying, and trouble of turning over many Volumes to compare and consult, which might be done in an Instant, by finding the Place requir'd, where all that every Author has observ'd to the purpose, wou'd appear at one View. 3^{dly}, It wou'd be of the greatest Use imaginable to Travellers, who are oblig'd not to incumber themselves with many Books, and yet cannot receive sufficient Information of all Parts from a few. 4^{thly}, It wou'd be of vast Use to Geographers, and of the greatest Importance in correcting and improving the M A P S and Geography. 5^{thly}, It wou'd be the most complete Geography that cou'd possibly be contriv'd, as containing all the Geographical and Historical Discoveries that have been at any time made. 6^{thly}, By help of an *Index* referring to all Places (as Cities, Towns, Villages, Castles, Rivers, Lakes, Mountains, Valleys, Plains, Forests, Woods, Desarts, Ruins, &c.) described in the Collection, it might be made to serve for a Geographical Dictionary, more complete than any extant.

Since this Treatise was written, there came to my Hands *Habiani Relandi Palestina*

lastina ex Monumentis veteribus illustrata;
 3 Tom. 4to, whoever examines it, will, I believe, allow it to be the most elaborate and judicious Piece of Geography, perhaps, that ever yet appear'd. The learned Author seems to be the only one that hath hit on the right Way of making a Geographical Collection, or at least, that hath taken the Pains to do it as it ought; for it is a perfect Common Place Book, where all the Geographical Observations contained in the Writings of the Ancients relating to that Country, may be met with under their proper Heads, with curious MAPS adapted to them; the whole very conformable to the foregoing Rules, which therefore I take to be sufficiently confirmed. There are many curious Remarks to the Purpose dispers'd thro' the Work, which wou'd have enabled me to have made my Design more complete, had it been my good Fortune to have been acquainted with it sooner. But something else may give Occasion one Time or other to speak further upon this Subject.



FINIS.

